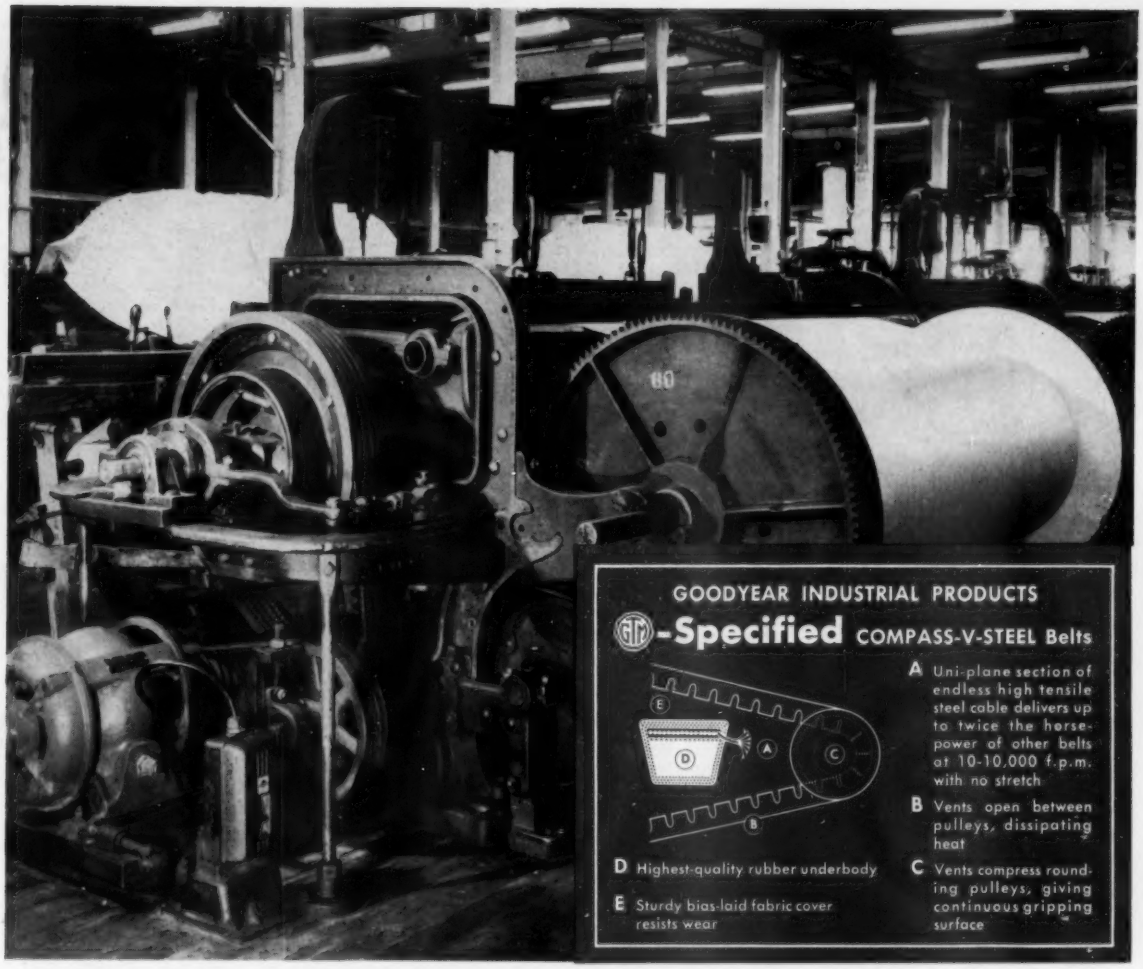
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'ROUND ABOUT with the editors in field and office

Edited by R. L. Marinello

Report from Europe

WITH ONE MONTH of European travel behind him, our editorial director, Dick Morris, tells us a little bit about where he has been and what he has seen, in his report appearing in this issue.

Members of the American Institute of Plant Engineers will be interested in reading about his attendance at the 100th Anniversary of the Verein Deutscher Ingenieure in Berlin.

In addition to attending the Incorporated Plant Engineers' annual Conference—this year it was held at Harrogate, England—he will attend the World Power Conference in Vienna.

The last leg of this trip will take him to Russia where he will have an opportunity to compare notes with Russian plant engineers and find out what problems are their main concern in keeping the plant going.

Avisco Promotes Plant Engineers

James Bennett, chief plant engineer at American Viscose Corporation's Front Royal rayon plant, has been appointed engineering consultant to the plant manager, A. G. McVay. Upon assuming his new post, Mr. Bennett will be succeeded by **Maurice P. Gooden** as chief plant engineer.

Mr. Bennett, born in Glasgow Scotland, has been with American Viscose since 1914. During his long career with the corporation he has taken an active part in supervising the building and equipping of plants at Lewistown, Pa., and Parkersburg and Nitro, West Virginia.

Mr. Gooden joined American Viscose in 1941 as an engineer at the corporation's Lewistown, Pa., plant. He became assistant chief plant engineer in 1947 and was transferred, in 1951, to the same post at the Front Royal plant. A native of Island Ford, Virginia, he was graduated from Virginia Polytechnic Institute with a B.S. degree in Mechanical Engineering.

Engineering Conference at MSU

MICHIGAN STATE UNIVERSITY will hold its 8th Annual Industrial Engineering Conference, from September 10 to 14, at East Lansing, Michigan.

As in the past, the week-long meeting will consist of general sessions and several discussion groups. The groups will be organized for the discussion of such topics as: Motion and Time Study, Plant Layout and Materials Handling; Industrial Engineering for Small Plants; and Statistical Methods in Industrial Engineering.

For further details of this conference, write to Professor James M. Apple, Department of Mechanical Engineering, Michigan State University, East Lansing, Michigan.

Personnel Change at Acme

William H. Fulwider has been appointed superintendent of the Electrical Division of Acme Steel Co., Chicago. Before joining the company in April of this year, he was with the Steel Division of Ford Motor Co. as chief draftsman in the Plant Engineering Department. From 1950 to 1954 he was supervisor of engineering in the Plant Engineering Department of the Ford Motor Co. Aircraft Engine Division.

For two years, 1948 and 1949, Fulwider was an electrical engineer with the Armco International Corp., Chicago. Prior to that he was with Cia Siderurgica Nacional, Brazil, and Inland Steel Co., Chicago. A graduate of Purdue University in 1926, he holds a B.S. degree in Electrical Engineering.

Lightning Arrester Course

IS YOUR PLANT and equipment protected against lightning damage? A lightning arrester training program is being conducted by Westinghouse Electric Corp. to tell electric utility engineers what precautionary measure should be taken to protect equipment.

The course is highly technical in nature, and represents a complete graduate training course in lightning protection, with particular emphasis on lightning arresters.

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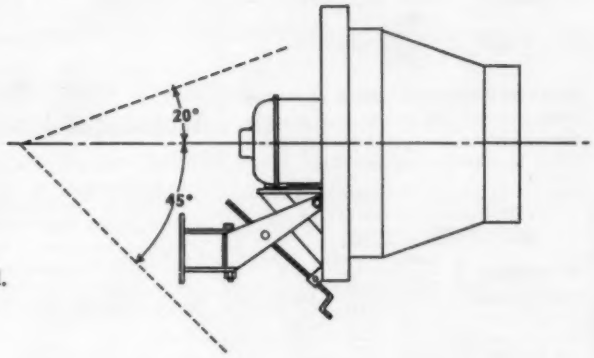

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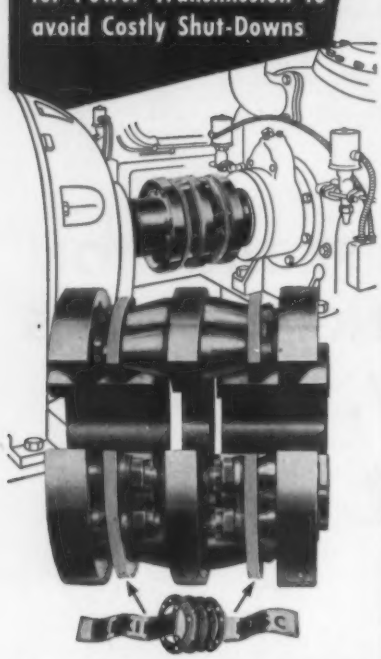

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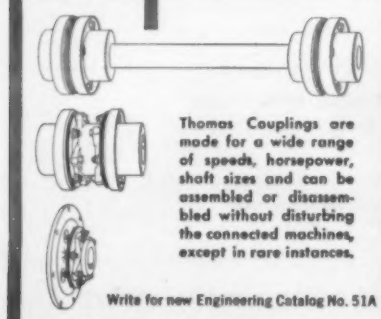

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'ROUND ABOUT

III: Lightning protection of substations and distribution circuits. Seminar IV: Protection of rotating a-c machinery, dry-type transformers and metal-clad switchgear.

Readers interested in getting more information about this course should address their inquiry to R. V. McGahey, Technical Publicity, Westinghouse Electric Corp., Box 2278, Pittsburgh 30, Pa.

Lighting and Power Conferences

BOSTON WILL BE the meeting place for this year's Illuminating Engineering Society's National Technical Conference. It will be held from September 17 to the 21st at the Hotel Statler, Boston, Massachusetts.

The 22nd National Exposition of Power and Mechanical Engineering will be held from November 26 to the 30th at the Coliseum in New York. Featured during the week will be the 76th annual meeting of the A.S.M.E., including sessions of the Society's Nuclear Engineering Division. The fifth annual Atomic Energy in Industry conference of the National Industrial Conference Board is another special feature which has been included in the schedule.

How to Reduce Workmen's Compensation Insurance

PRACTICAL METHODS of reducing workmen's compensation insurance costs are described in the booklet, "A New Way to Reduce the Cost of Workmen's Compensation Insurance," just published by Liberty Mutual Insurance Co.

The booklet outlines the four basic components of a health program: an in-plant medical plan, an industrial hygiene program, a medical advisory service, and a rehabilitation program.

The in-plant medical section deals with the treatment of injured workers, preplacement examinations, follow-up examinations, health counseling and education, and the physical and emotional causes of accidents.

Under industrial hygiene, the booklet shows how to reduce industrial injuries from such new hazards as radiation, air pollution and toxic chemicals. The problem of hearing loss from industrial noise is also discussed.

The booklet also describes the medical advisory service and the comprehensive rehabilitation program provided by this insurance company.

Readers interested in obtaining a copy of this 44-page booklet should write to Liberty Mutual Insurance Co., 175 Berkeley Street, Boston 17, Massachusetts.

Ceramic Cutting Tools

MINUTES OF A symposium of experts on ceramic cutting tools, held at the Army's Rodman Laboratory, Watertown, Arsenal, are now available in booklet form.

Papers contained in the publication are: Processing Ceramics, by Prof. F. H. Norton, M.I.T.; Properties and Use of Ceramic Tools, by Dr. E. Ryshkewitch, Kearfott Co., Inc.; Notes on Ceramic Tools by W. M. Wheildon, Norton Co.; Molybdenum Boride Cutting Tool by E. DiCesare, Watertown Arsenal; Preparing Ceramic Tool Material, by B. Bovarnick, Watertown Arsenal; and Machining Studies by W. B. Kennedy, Watertown Arsenal.

This publication, PB 111757, Minutes of Symposium on Ceramic Cutting Tools, Feb. 1955, 127 pages may be ordered from Office of Technical Services U. S. Department of Commerce, Washington 25, D. C., price $3.25.

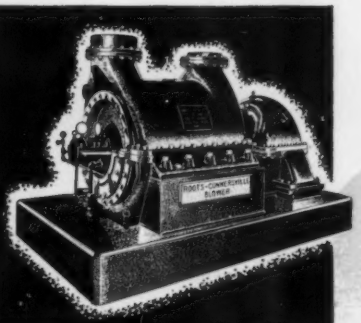
How to Keep Production Rolling in Case of Disaster

SIXTEEN DEFENSE experts, representing the Eastern Seaboard Armed Services Industrial Mobilization Council, recently attended a demonstration at the Alden Research Center, Westboro, Mass. The problem of the day was: How to keep production rolling when plants have been bombed out or wiped out by any disaster.

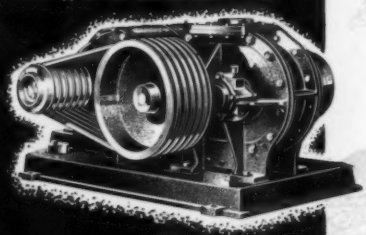
Defense experts view demonstration at Alden Research Center where a production line was set up in 29 minutes

From a bare floor start, a complete manufacturing operation, including power, facility and communication for each work position was set up. Operators and production equipment was moved in and in 29 minutes actual production from a four-position operation was coming off the line.

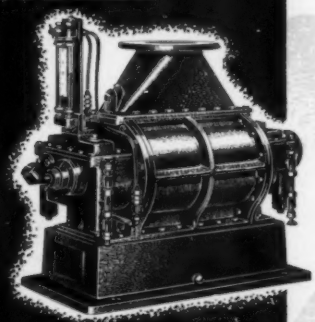
The significance to these people, interested in defense security was this: that in 12 hours with only two men, a 100 position plant could be completely set up and in operation, and in 12 hours with 20 men a 1000 position plant could be completely set up. This is made possible by Alden Work Center System components which are standard, prefabricated units—sectionalized so that units can be put together for any desired length or work positions arranged in any desired way.



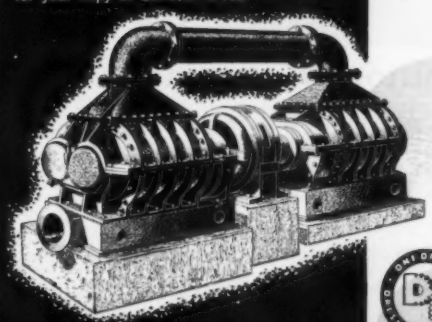
CENTRIFUGAL or Rotary Positive Blowers and Exhausters can move from 5 cfm to 100,000 cfm of air for many diversified needs. For complete details, send for Bulletins 120-B-14, AF-154 and RB-154.



GAS PUMPS can be applied to many industrial uses where from 5 cfm to 50,000 cfm are needed. Send for Bulletins 31-B-17 and 32-33-B-13 for full information.



METERS measure gas up to 1,000,000 cfh or as little as 4,000 cfh with constant accuracy. For specifications and capacity tables, send for your copy of Bulletin M-152.



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347 Local General Electric Distributors Announce . . .

"OFF-THE-SHELF" DELIVERY OF G-E

NOW—347 G-E motor Distributors throughout the country have increased their stocks to give motor buyers faster delivery of G-E Tri-Clad* '55' motors. They now carry a complete line of Tri-Clad motors—listed at right—to keep your down time at a minimum and to help cut your standby inventory. Dial your local G-E Distributor today. His name and phone number are listed on the following pages. Call him now and he'll send you a handy Tel-Eze phone index—FREE.

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HP	RPM	ENCLOSURE	HP	RPM	ENCLOSURE
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5	1200	Enclosed	15	1800	Drippproof
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7½	1800	Enclosed	20	1800	Drippproof
10	1800	Drippproof	20	1800	Enclosed

All motors are standard, 208-220/440-volt, 60-cycle, 3-phase, Type K, ball-bearing models.

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General Elec. Supply Co.
T. J. Dornbusch, HA 5-2655
Graybar Elec. Co., Inc.
Jack Bauer, GR 6-1357
Swanson Nunn Elec. Co.
R. W. Lottes, HA 5-3321

FT. WAYNE
General Elec. Supply Co.
F. Rentschler, HA-3243
Nussbaum Elec. Co.
John Kinsey, AN-2252

HAMMOND
General Elec. Supply Co.
Lloyd Nettles, WE 1-5155
Graybar Elec. Co., Inc.
Andy Sarti, Tilden 4-7800

INDIANAPOLIS
General Electric Supply Co.
F. H. Townsend, ME 4-8443
Graybar Elec. Co., Inc.
M. P. Kirsch, ME 8-2351

SOUTH BEND
Koontz-Wagner Elec. Co., Inc.
H. B. Kumm, Central 3-8251

IOWA

BURLINGTON
Crescent Elec. Supply Co.
F. J. Hemann, PL 2-3631

CEDAR RAPIDS
Crescent Elec. Supply Co.
Leo Plotz, 3-9601

DAVENPORT
Crescent Elec. Supply Co.
George Mittman, 3-1811
Graybar Elec. Co., Inc.
R. J. Nelson, 3-2767

DES MOINES
Elec. Engrg. & Equip. Co.
L. E. Morse, AT 2-0431
General Elec. Supply Co.
C. B. (Barney) Peek, AT 8-7401

DUBUQUE
Crescent Elec. Supply Co.
Francis McDonough, 3-6411

WATERLOO
Crescent Elec. Supply Co.
James D. Martin, Adams 4-6866

KANSAS

PITTSBURG
Atkinson Armature Works
Frank Horton, 1754

WICHITA
General Elec. Supply Co.
Jim Owens, AM 5-0627

KENTUCKY

HARLAN
General Elec. Supply Co.
Bud Thompson, 815

LEXINGTON
General Elec. Supply Co.
Paul E. Hines, 2-1887
Graybar Elec. Co., Inc.
L. W. Wester, 5-2020

LOTHAIR
Mine Service Co.
Phone 239

LOUISVILLE
General Elec. Supply Co.
Jack Mattingly, ME 7-3651
Graybar Elec. Co., Inc.
C. J. Honadle, Melrose 7-5411
Marine Elec. Company
Melvin Theobald, Juniper 4-7175

LOUISIANA

ALEXANDRIA
Brown Roberts Elec. Co.
Mack King, 3-7281

BATON ROUGE
General Elec. Supply Co.
G. F. Shilling, 7-7586

NEW ORLEANS
General Elec. Supply Co.
Harvey Wager, Galvez 5771
Graybar Elec. Co.
John Palmer, Canal 6263
New Orleans Armature
John Berger, Canal 9566
Standard Supply & Hardware Co.
A. W. Herbert, CA 6641

SHREVEPORT
General Elec. Supply Co.
W. L. Smith, 4-1436
Graybar Elec. Co., Inc.
J. L. Roberson, 5-3271

MAINE

PORTLAND
General Elec. Supply Co.
Harold French, Spruce 2-3721

WESTBROOK
Stultz Elec. Works
Robert Webb, UL 4-2501

MARYLAND

BALTIMORE
General Elec. Supply Co.
George Smorse, LE 9-3565
Graybar Elec. Co., Inc.
P. J. Curreri, SA 7-5050

HAGERSTOWN
General Elec. Supply Co.
A. L. Daly, 6216
Hagerstown Equip. Co.
Allen E. Ocker, 3813

MASSACHUSETTS

BOSTON
General Elec. Supply Co.
Carl Jackson, AL 4-5300
Graybar Elec. Co., Inc.
George Milligan, KE 6-4567
Sandman Elec. Co., Inc.
Robert L. Sandman, HI 2-7600

FITCHBURG
Service Elec. Supply Co., Inc.
George N. Bussiere, Jr., 3-4811

LOWELL
White Elec. Motors
Brent L. Smith, GL 8-6336

LYNN
Des Roberts Elec. Supply Co.
G. W. Knowlton, Lynn 5-0015

SPRINGFIELD
General Elec. Supply Co.
Errol Fournier, RE 4-8255

WORCESTER
General Elec. Supply Co.
Francis Cross, Pleasant 6-4351

MICHIGAN

BATTLE CREEK
Mid-States Elec. Supply Inc.
R. E. Hartmann, WO 3-6635

DETROIT
Frank C. Teal Elec. Co.
Victor L. Kochajda, LO 8-9092
General Electric Supply Co.
O. C. Hall, TR 5-9400
Graybar Elec. Co., Inc.
TO 8-5550
Miller-Seldon Elec. Co.
T. E. Shreve, TY 4-3800
Spaulding Elec. Co.
A. P. Schaupner, WO 2-6200

FLINT
General Elec. Supply Co.
C. R. Hechinger, Sunset 9-9101
Graybar Elec. Co., Inc.
R. E. Peacock, CE 2-4101

GRAND RAPIDS
Clement Elec. Distributing Co.
Herb Bothee, GL 6-7271
General Elec. Supply Co.
D. A. Harper, Glandale 9-3243
Graybar Elec. Co., Inc.
GL 1-2701

JACKSON
Elec. Wholesale Supply Co.
P. Spry, 2-7123

KALAMAZOO
General Elec. Supply Co.
G. E. Herrington, 3-2645

LANSING
Barker-Fowler Elec. Co.
M. V. Green, IV 4-4406
General Elec. Supply Co.
J. H. Gallagher, Ivanhoe 7-5401
Graybar Elec. Co., Inc.
M. Pratt, IV 7-5075

MUSKEGON
Fitzpatrick Electric Supply Co.
2-6621

SAGINAW
General Elec. Supply Co.
N. C. Stuart, 3-6474

MINNESOTA

DULUTH
Graybar Elec. Co., Inc.
Arney Sabree, RA 2-6685

MINNEAPOLIS
Lakeland Engrg. Equip. Co.
Bob Borg, FE 8-7531
Sterling Elec. Co.
E. H. McQuire, FE 2-4571

ST. PAUL
General Elec. Supply Co.
R. Woods, MI 5-2761

MISSISSIPPI

JACKSON
Power Elec. Co.
J. P. Hutchinson, 5-8361

MISSOURI

JOPLIN
General Elec. Supply Co.
Jim Williams, MA 4-5622

KANSAS CITY
General Elec. Supply Co.
Harold Burrows, HA 1-7447

ST. LOUIS
General Elec. Supply Co.
Walter Euler, JE 1-3000
Graybar Elec. Co., Inc.
Wayne Aceto, JE 1-4700

MONTANA

BILLINGS
General Elec. Supply Co.
D. L. Beck, 9-4550

BUTTE
Graybar Elec. Co., Inc.
Dick Murtha, 3233

NEBRASKA

OMAHA
General Elec. Supply Co.
Tom Ridgeway, Jackson 0456
Graybar Elec. Co., Inc.
Fred B. Hanson, Webster 7676
Schneider Elec. & Equip. Co.
W. J. Andersen, Webster 5550

NEVADA

RENO
Linnecke Elec. Sales Co.
W. R. Reynolds, Reno 3-3729

NEW HAMPSHIRE

MANCHESTER
General Elec. Supply Co.
Joe Charron, NA 5-5418

GENERAL ELECTRIC

SHELF" DELIVERY OF G-E MOTORS 5 TO 20 HP

NEW JERSEY
CAMDEN
National Elec. Supply Co.
Meyer Borstein, Emerson 5-4330
NEWARK
General Electrical Equip. Co., Inc.
George Sherman, MI 2-7420
General Elec. Supply Co.
Bill Lutton, BI 2-1600
Graybar Elec. Co., Inc.
H. Pearce, MA 2-5100
NEW BRUNSWICK
A. Bishop Elec. Motor Exchange
Arnold Bishop, KI 5-6446
PATERSON
General Elec. Supply Co.
G. Weindling, LA 5-5100
Reliable Elec. Motor Repair Co.
Harold Muller, AR 4-7756
Watson-Flagg Sales Corp.
E. M. Koetsier, LA 5-2324
TRENTON
General Elec. Supply Co.
Ray Jamieson, Owen 5-3453
Thropp Elec. Sales Corp.
C. W. Archinal, JU 7-1441

NEW MEXICO
ALBUQUERQUE
A. E. Boyd Equipment Co.
4-6016
Electric Service, Inc.
2-9447
General Elec. Supply Corp.
2-5246

NEW YORK
ALBANY
Graybar Electric Co., Inc.
5-1563
Havens Electric Co., Inc.
5-1201
BUFFALO
General Electric Supply Co.
R. H. Sheldon, EL-5100
Graybar Electric Co., Inc.
Lou Pfeffer, WA-3700
BROOKLYN
Apparatus Distributor, Inc.
Len Keller, UL 2-4000
ELMIRA
Le Valley McLeod, Inc.
John F. Decker, 6163
GLENS FALLS
Glens Falls Electric Supply Co., Inc.
2-5868
JAMAICA
Central Queens Elec. Supply Corp.
Charles Weitner, RE 9-2020
LONG ISLAND CITY
Graybar Elec. Co., Inc.
L. H. Kort, EX 2-2000
Motors & Armatures, Inc.
Sid Davis, EX 2-3523
NEW YORK
Electric Motors Corp.
M. Goldberg, CA 6-4665
General Elec. Supply Co.
Jim Boyland, AL 5-3300
W. W. Grainger, Inc.
E. Heckler, CA 6-3810
Hudson Elec. Sales Co., Inc.
D. Hark, WO 2-3041
POUGHKEEPSIE
Electra Supply Co., Inc.
Howard K. Phillips, 8000
ROCHESTER
Electric Equip. Co. Div.
Norry Elec. Company
GL-6070
General Elec. Supply Co.
Dan Nolan, HA 7500
T. H. Green Electric Co.
HA-9840
SYRACUSE
M. H. Salmon Elec. Co., Inc.
E. S. Bowser, 73-3325
TROY
Tri-State Elec. Motors, Inc.
D. W. Fitzpatrick, Ashley 2-4250
UTICA
Langden & Hughes Elec. Co., Inc.
C. A. Dyer, 4-3154
Mather, Evans & Diehl Co., Inc.
Bill Diehl, 4-6165

NORTH CAROLINA
ASHEVILLE
General Elec. Supply Co.
A. L. Henderson, 2-4481
CHARLOTTE
Armature Winding Co.
J. E. Jenkins, ED 3-2158
General Elec. Supply Co.
J. B. Hurt, Jr., FR 5-7321
Mill-Power Supply Co.
B. M. Foster, Franklin 5-5761
FAYETTEVILLE
General Elec. Supply Co.
T. C. Merritt, 2-5143
GREENSBORO
General Elec. Supply Co.
John F. Alexander, 3-8207
GREENVILLE
General Elec. Supply Co.
Bob Prevatte, 5104
LAURINBURG
Electrical Equip. Co.
H. A. Gill, 1196
RALEIGH
Electrical Equipment Co.
W. T. Becton, TE 2-2039
General Elec. Supply Co.
C. T. Parks, TE 3-4691
WINSTON-SALEM
Graybar Elec. Co., Inc.
D. W. Terry, 4-2461

OHIO
AKRON
General Elec. Supply Co.
Joe Wagner, FR 6-8195
Graybar Electric Co., Inc.
Robert Bender, JE 5-4143
CANTON
General Elec. Supply Co.
Dean Ray, GL 4-5187
Jackson-Bayley Electric Co.
W. Bayley, Jr., GL 5-9421
CINCINNATI
General Elec. Supply Co.
GA 1-1750
Graybar Elec. Co., Inc.
MA 1-0600
CLEVELAND
Elliott Electric Co.
F. G. Allan, TO 1-2454
General Elec. Supply Co.
Len Burns, HE 1-7280
Graybar Electric Co., Inc.
G. W. MacCarter, HE 2-2500
Strong, Carlisle & Hammond Co.
Jim Simmons, TO 1-8800

COLUMBUS
General Elec. Supply Co.
D. B. Gartrell, CA 8-4371
Graybar Electric Co., Inc.
L. C. (Lou) Bagent, CA 8-3811
The Loeb Electric Co.
Marion Klocki, AX 9-1142
DAYTON
General Elec. Supply Co.
MI 0781
Graybar Elec. Co., Inc.
MI 5665
HAMILTON
The Wente Elec. Co.
TW 4-8128
PORTSMOUTH
General Elec. Supply Co.
3-2341
TOLEDO
General Elec. Supply Co.
L. J. Cole, Cherry 4-8661
Graybar Elec. Co., Inc.
Al Katafiasz, EX-1641
YOUNGSTOWN
Economy Electric
E. Cutler, Jr., Riverside 4-4461
General Electric Supply Co.
C. B. Monroe, Riverside 6-6511
Graybar Elec. Co., Inc.
George Rowlands, Riverside 4-0124

OKLAHOMA
DUKE
I. V. Owen Co.
Ronald Owen, 72
OKLAHOMA CITY
Graybar Elec. Co., Inc.
Jim Cavanaugh, FO 5-9351
TULSA
General Electric Supply Co.
F. G. Ross, DI 3-6121
Graybar Elec. Co.
Ray Downing, MA 6-2121
WEWOKA
Okla. Ind. Elec. Supply Co.
Jim Embach, 287

OREGON
COOS BAY
Marshfield Elec. Co.
U. E. Richter, Congress 7-6319
EUGENE
American Steel & Supply Co.
R. E. Yates, Diamond 5-0373
KLAMATH FALLS
Klamath Mach. Co.
H. Ellis, 2-2588
MEDFORD
American Steel & Supply, Inc.
R. S. Rix, 2-7181
General Elec. Supply Co.
P. Jorgenson, 3-4519
PORTLAND
Eoff Electric Co.
CA 2-9411
General Elec. Supply Co.
CA 7-0651
Graybar Elec. Co., Inc.
CA 7-6641
Holt & O'Donnell
CA 8-0753
ROSEBURG
Industrial Elec. Service Co.
L. Hobart, OR 3-6658

PENNSYLVANIA
ALLENTOWN
Allen Elec. Co.
L. Brown, HE 5-9515
General Electric Supply Co.
Bob Harte, Hemlock 3-5206
BRADFORD
Bovaird & Co.
L. V. Brown, 7141
DREXEL HILL
General Elec. Supply Co.
F. Robinson, CL 9-6440
ERIE
General Elec. Supply Co.
Al Weirich, 2-1477
INDIANA
National Mines Service Co.
5-5655
JOHNSTOWN
General Elec. Supply Co.
W. C. Hill, 7-5101
LANCASTER
Raub Supply Co.
G. E. Brown, 7-6221
PHILADELPHIA
A. J. Lacourse
Eugene Batdorf, MA 7-1895
General Elec. Supply Co.
E. C. Durkin, GA 6-8800
Graybar Elec. Co., Inc.
P. D. Chick, WA 2-5405
Jos. T. Fewkes & Co.
Ray Gillin, WA 2-2241
PITTSBURGH
General Elec. Supply Co.
D. J. Finn, Fairfax 2-1530
Graybar Elec. Co., Inc.
Mark Glasgow, FA 2-4100
READING
General Elec. Supply Co.
Bill Rodgers, Reading 4-2169
SCRANTON
General Elec. Supply Co.
H. McDowell, Diamond 4-8563
Scranton Elec. Construction Co.
A. W. Winter, DI 2-3152
SHARPSBURG
Globe Elec. Repair Co.
Steve Marshall, Sterling 1-2677
WESTCHESTER
Westchester Elec. Supply Co.
R. McLaughlin, WE 4722
WILLIAMSPORT
Lowry Electric Co., Inc.
P. M. Griffin, 2-7841
WILKES-BARRE
General Elec. Supply Co.
H. G. Holland, Valley 2-5106

RHODE ISLAND
PROVIDENCE
General Elec. Supply Co.
W. L. Higgins, GA 1-6523
J & H Electric Co.
Calvin Wilcox, GA 1-7840
PAWTUCKET
N. E. Elec. Supply Co.
Pawtuckett 5-7400

SOUTH CAROLINA
ANDERSON
Woodward-Stephens Co., Inc.
D. Fred Stephens, CAnal 5-2501
GREENVILLE
J. W. Vaughan Co.
Newell Eastland, 2-2421
SUMTER
Sumter Machinery Co.
B. A. Siddall, SPruce 3-7321

SOUTH DAKOTA
ABERDEEN
McLaughlin Elec. Supply House
Don Lehr, 4911
RAPID CITY
Crescent Elec. Supply Co.
T. R. Hersey, FI 2-7913

TENNESSEE
CHATTANOOGA
Elec. Motor Sales & Supply Co.
Frank N. Griscom, Jr., 9-7361
Graybar Elec. Co., Inc.
Max Evans, 4-3351
COLUMBIA
Middle Tenn. Armature Wks.
R. Cleveland, EV 8-3672
MEMPHIS
Graybar Elec. Co., Inc.
Jim Branson, BR 8-7150
Tri-State Armature & Elec. Wks.
W. W. Bumpus, JA 7-8414
NASHVILLE
Industrial Sales Co., Inc.
N. G. Welch, Alpine 4-3508
Nashville Armature Co.
Alpine 6-2546

TEXAS
ABILENE
General Elec. Supply Corp.
Ray Alexander, 2-2827
Graybar Elec. Co., Inc.
Buck Buchanan, 2-2861
AMARILLO
General Elec. Supply Co.
B. D. Garrett, DR 6-7254
Graybar Electric Co., Inc.
G. N. Barker, DR 2-6778
BEAUMONT
General Elec. Supply Co.
Arlan Young, 4-6435
CORPUS CHRISTI
Bradley Motor & Armature Works
Ernest B. Williamson, TU 2-8891
General Elec. Supply Co.
W. D. Clarke, TU 2-9237
Graybar Elec. Co., Inc.
M. J. Smith, TU 4-6374
DALLAS
General Elec. Supply Co.
Ollis W. Walden, RA-2201
Graybar Elec. Co., Inc.
Jerry Foster, RA 6452
W. M. Smith Elec. Co.
Gene Jackson, Hamilton 8-4606
EL PASO
General Elec. Supply Co.
Joe Caldwell, 3-3407
Graybar Elec. Co., Inc.
H. Chaparro, 3-7561
FT. WORTH
General Elec. Supply Co.
Paul Huntley, ED 2-5385
Graybar Elec. Co., Inc.
Bill Hart, ED 5-4523
HOUSTON
Buffalo Elec. Co.
Chuck, Sonny, or Andy, CA 8-4431
General Elec. Supply Co.
T. W. Haley, FA 3-3121
Graybar Elec. Co., Inc.
Tom Keen, CA 8-4571
Oliver Armature Works
Thurman Tedder, CA 2-9271
LUBBOCK
General Elec. Supply Co.
Allen Pistole, PO 3-8271

More G-E Distributors on Next Page...

GENERAL ELECTRIC

"OFF-THE-SHELF" DELIVERY OF G-E MOTORS 5 TO 20 HP

(Continued from preceding page)

MIDLAND
I. W. Hynd Co.
Wesley Adams, MU 4-5501
SAN ANTONIO
San Antonio Machine & Supply Co.
S. V. Patrick, CA 5-1651
General Elec. Supply Co.
J. A. Russell, CA 7-1261
TYLER
General Elec. Supply Co.
R. A. Hamilton, 2-1674
WACO
General Elec. Supply Co.
Henry L. Fleischhauer, 2-161
WICHITA FALLS
Elec. Motor Co.
Eugene phillips, 7-7841

UTAH
SALT LAKE CITY
General Elec. Supply Co.
EM 3-3911
Graybar Elec. Co. Inc.
Elgin 9-8771
Refrigeration Distributors Corp.
DA 2-5886

VIRGINIA
RICHMOND
Electrical Equip. Co.
T. L. Campbell, 7-2647
General Elec. Supply Co.
L. V. French, 6-4941
NORFOLK
General Elec. Supply Co.
W. E. Sheppard, MA 2-7183
ROANOKE
General Elec. Supply Co.
J. W. Hughes, 3-1564
Graves-Humphreys Hdw. Co., Inc.
R. W. Eldridge, 3-8011
Graybar Elec. Co., Inc.
W. C. John, 3-3615

WASHINGTON
SEATTLE
General Elec. Supply Co.
H. J. Halvorsen, SE 6400
Graybar Elec. Co., Inc.
J. R. Savage, MU-0123
Shields, Harper & Co.
S. Klinefelter, EL-2674
SPOKANE
General Elec. Supply Co.
L. F. Stephens, KE 0431
Graybar Elec. Co., Inc.
W. C. Sanders, EM 6611
TACOMA
General Elec. Supply Co.
Dean Elton, BR 8454

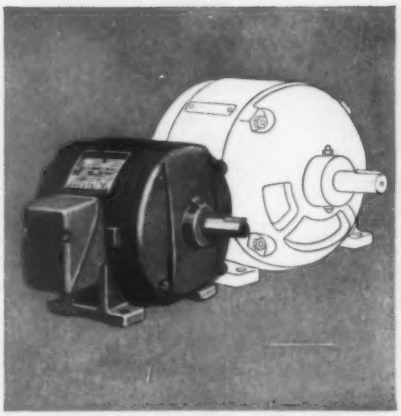
WEST VIRGINIA
BLUEFIELD
Bluefield Supply Co.
W. E. McDougle, DA 5-6131
CHARLESTON
Virginian Electric, Inc.
W. H. Knight, 6-0631
HUNTINGTON
Virginian Electric, Inc.
L. E. Pauley, 2-8396
LOGAN
Logan Hardware & Supply Co.
J. P. Swindell, 710
WHEELING
General Elec. Supply Co.
R. L. Nickerson, 2555

WISCONSIN
APPLETON
General Elec. Supply Co.
W. Van Weele, RE 4-7155
GREEN BAY
Graybar Elec. Co., Inc.
K. C. Lynch, HE 7-3284
Beemster Elec. Co.
H. N. Beemster, HE 7-3238
MADISON
Crescent Elec. Supply Co.
C. L. Gilbert, AL 6-5441
Elec. Motor Service
C. Sutherland, AL 6-6724
MILWAUKEE
General Elec. Supply Co.
L. E. (Bud) Tapp, Broadway 6-7730
Graybar Elec. Co., Inc.
R. R. Schober, BR 6-8400
WAUSAU
Snapp Elec. Supply Co.
R. C. Runquist, 2-1031

WYOMING
CASPER
General Elec. Supply Co.
K. R. Brown, 2-7333
CHEYENNE
Frontier Elec. Supply Co.
2-6453

TERRITORY OF HAWAII
HONOLULU
American Factors, Ltd.
Ken Asari, 5-1511

What's Your Motor Problem?



NEED A MORE COMPACT MOTOR? . . .

Excess bulk has been trimmed and all wasted space eliminated from TRI-CLAD *'55'* Motors. Some are up to one-third more compact!

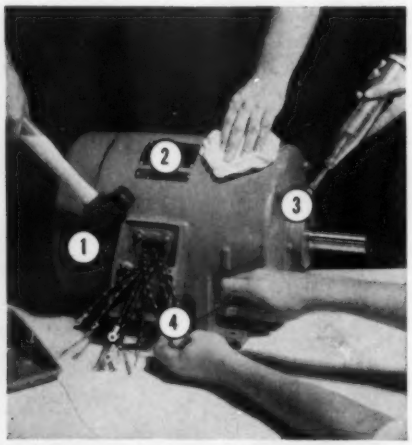
ONE THAT WATER WON'T FAZE? . . .

New miracle materials in the TRI-CLAD *'55'* insulation system make it shed water like a duck's back!

AND 60% GREATER PROTECTION? . . .

New enclosure on the TRI-CLAD* *'55'* (above) guards it against dirt, dust and moisture *far better* than old-style motors!

**Registered trademark of General Electric Co.*



WITH MUCH EASIER MAINTENANCE? . . .

(1) Man-size knock-off lugs, (2) stainless steel nameplate, (3) provision for regreasing on the job, (4) permanently numbered leads.

For more information on the new, fast-service plan—and "special" G-E Tri-Clad motors—call your local G-E motor Distributor.

MEDIUM INDUCTION MOTOR DEPARTMENT
GENERAL ELECTRIC COMPANY, SCHENECTADY 5, N. Y.

GENERAL ELECTRIC

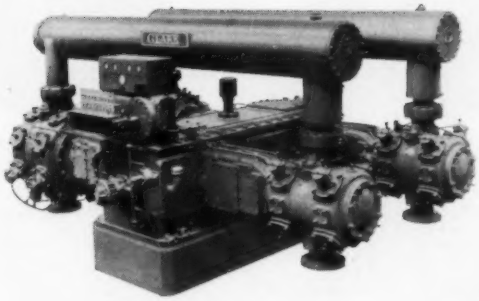
For more facts circle 506 on Reply Card

any flat means trouble

but in plant air supply it also means lost production!

Unless your plant air supply has adequate capacity in reserve, you may actually slow down your entire production every time you add a new labor-saving air-operated tool or device.

New increased demands on overloaded or overextended air supply inevitably cause a pressure drop all along the line. That means every tool, chuck and wrench slows down . . . and production suffers.



When did you last check your air at the *end* of the line? If it is going "flat," a Clark Balanced/Opposed Air Compressor will restore full pressure and, at the same time, *provide for a planned reserve to take care of future demand.*

There is a Clark Representative near you ready to give you all the facts. Why not call him now or write for your copy of Bulletin 118?

CLARK BROS. CO., OLEAN, N. Y.
One of the Dresser Industries
Offices in principal cities throughout the world

CLARK®

Balanced
Opposed
Compressors

For more facts circle 507 on Reply Card

Now—for maximum Roof Protection Johns-Manville

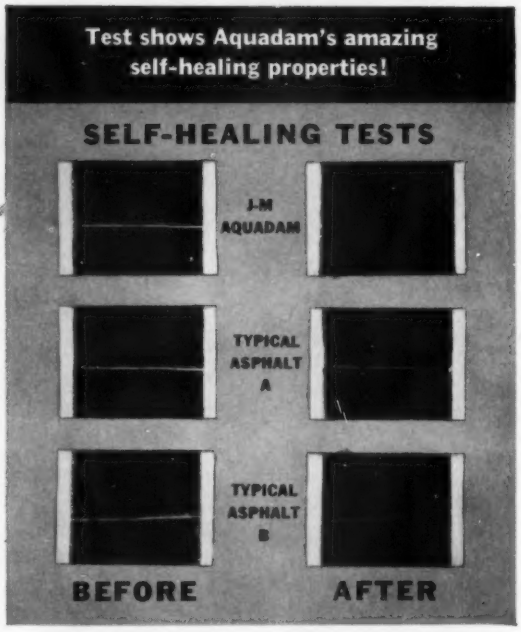
Aquadam

(slag or smooth surfaced)

Built-Up Roofs*

Aquadam offers these important advantages:

- Improved self-healing properties
- Superior weather resistance
- Superior resistance to cracking
- Greater kettle stability
- Exceptional adhesion—stronger bond
- Better resistance to water
- Excellent uniformity



After exposure to normal summer roof temperatures, Aquadam (top) has completely resealed and repaired itself. Asphalt A (middle) and B (bottom) show little or no self-healing properties.

J-M Aquadam proved superior by actual test... helps provide longer roof life at no extra cost

J-M Aquadam Built-Up Roofs owe their proven superiority to the newly developed bituminous cementing agent Aquadam—which is used in the application of the roofing felts.

When applied, the excellent adhesive properties of Aquadam provide a permanent bond to the felts, and to gravel or slag surfacing. Its rigidly controlled quality and excellent flow properties assure easier mopping, thorough coverage, and longer lasting roof life.

Johns-Manville Aquadam is specifically designed to provide maximum built-up roof service for deck inclines from dead level to ½″ per foot*.

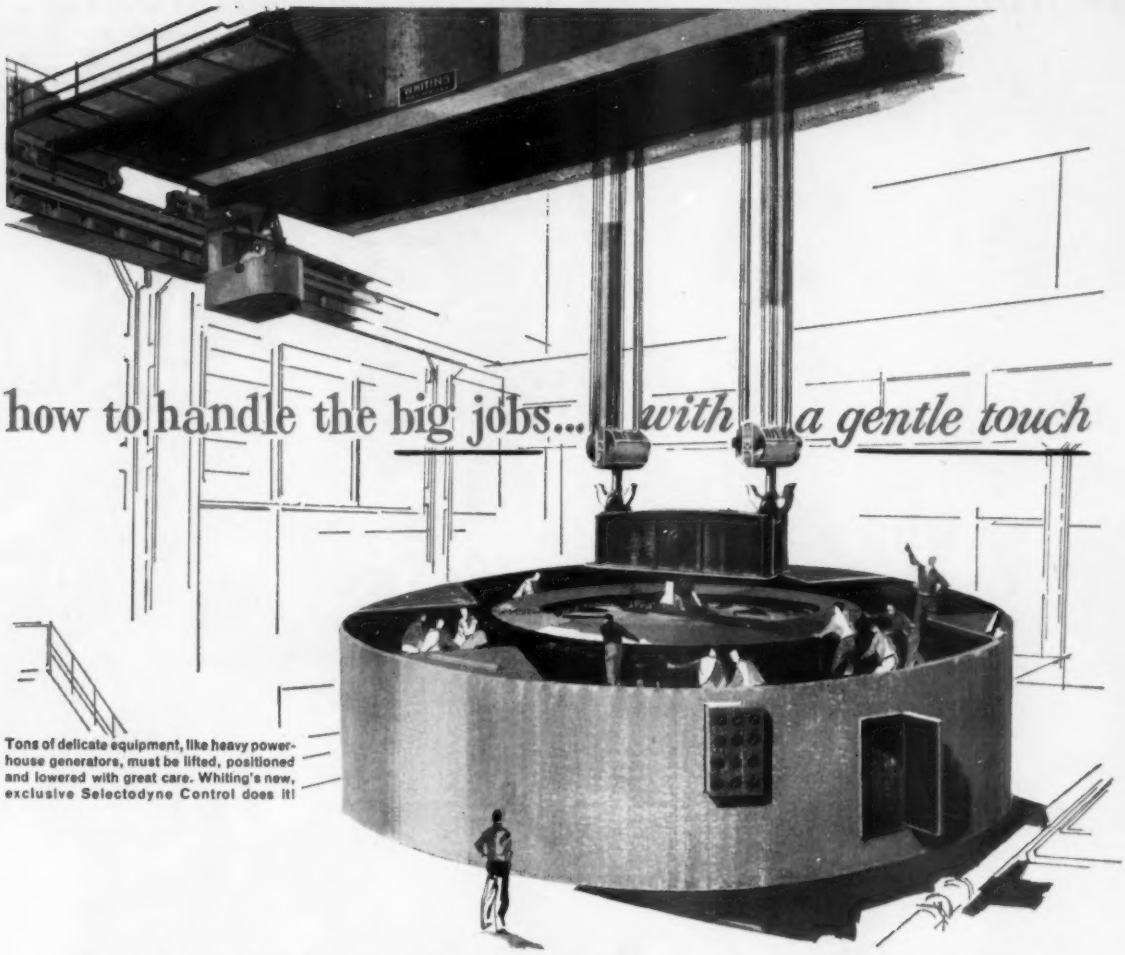
Your local Approved J-M Contractor, listed in the classified telephone directory, has complete information about Aquadam Built-Up Roofs. Or write Johns-Manville, Box 158, New York 16, N. Y. In Canada, write 565 Lakeshore Rd. East, Port Credit, Ontario.

JOHNS-MANVILLE JM PRODUCTS

Johns-Manville

For more facts circle 508 on Reply Card

how to handle the big jobs... with a gentle touch



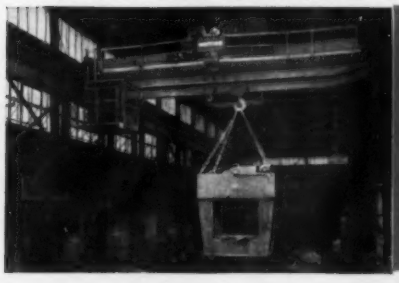
Tons of delicate equipment, like heavy power-house generators, must be lifted, positioned and lowered with great care. Whiting's new, exclusive Selectodyne Control does it!

Industrial management demands a lot from a crane. Rightly so, because a crane represents a major investment. This is why men with many of the nation's largest industries talk over their crane requirements with Whiting engineers before planning plant expansion or crane replacement. After considering all facts, they often choose Whiting Engineered Travelling Overhead Cranes. Why? . . . facts like these: Whiting has over 70 years experience in designing cranes for every type of industry—from power to paper. Whiting cranes permit greater handling precision for large or small loads . . . from one ton to 450. Whiting cranes keep returning the investment because of their remarkable endurance and extremely low maintenance. It's good business to consult Whiting on your crane requirements.

Heavy handling costs less with a Whiting Crane and our Bulletin No. 80 tells why. Write for it today! If you specify, we will also send interesting crane case studies.

WHITING CORPORATION
15675 Lathrop Avenue, Harvey, Illinois

▼ Fifty-ton capacity Whiting Overhead Crane moves giant press to final assembly area in Danly Machine Specialties, Inc. plant.



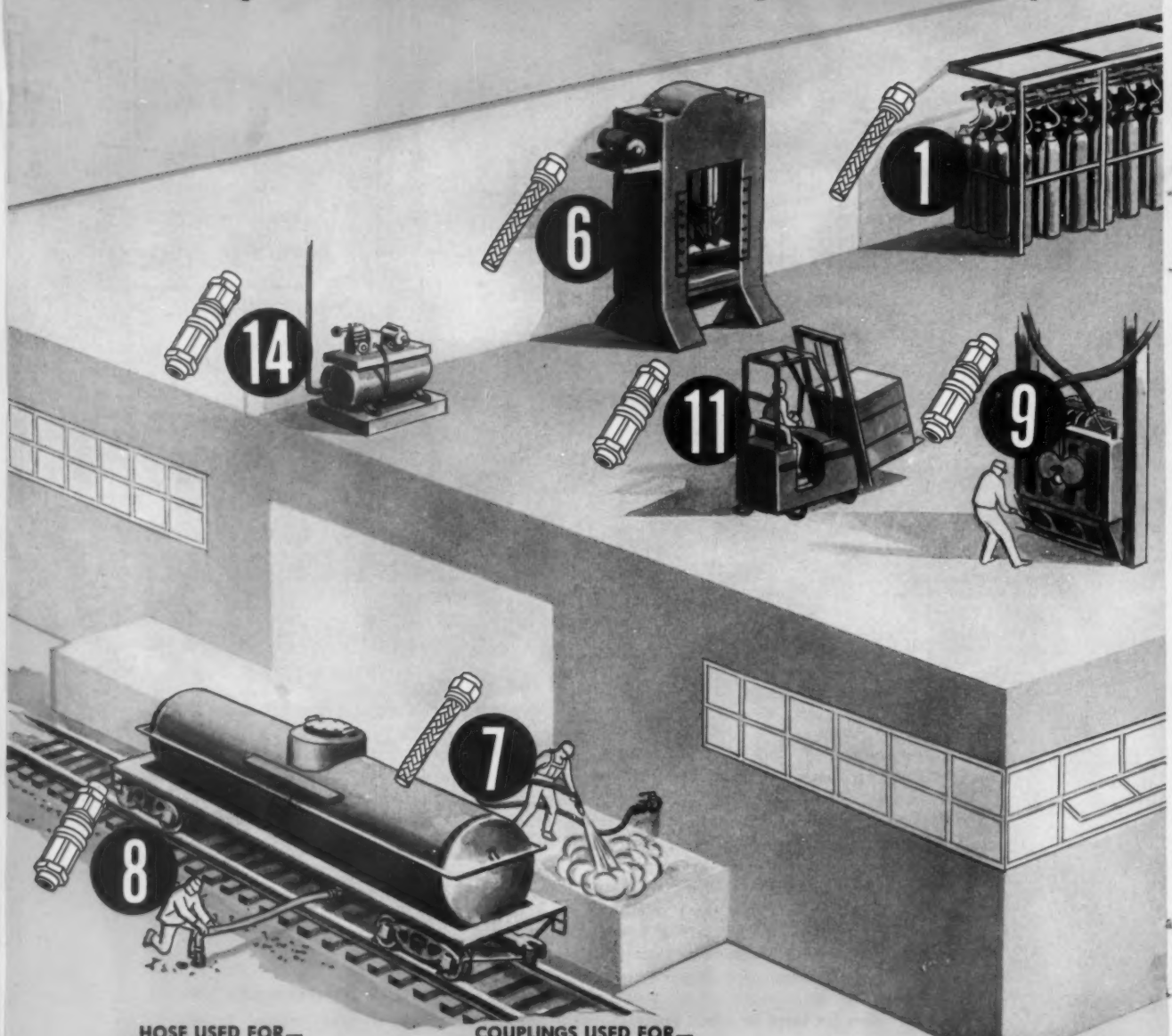
This 15-ton capacity Whiting Overhead Crane is in constant use unloading heavy steel plates for Midland Steel Products Co. ▼

WHITING
ENGINEERED CRANES

For more facts circle 509 on Reply Card

For more facts circle 510 on Reply Card ⟶

Leakproof couplings and durable metal hose... versatile problem-solvers for any industrial plant



HOSE USED FOR—

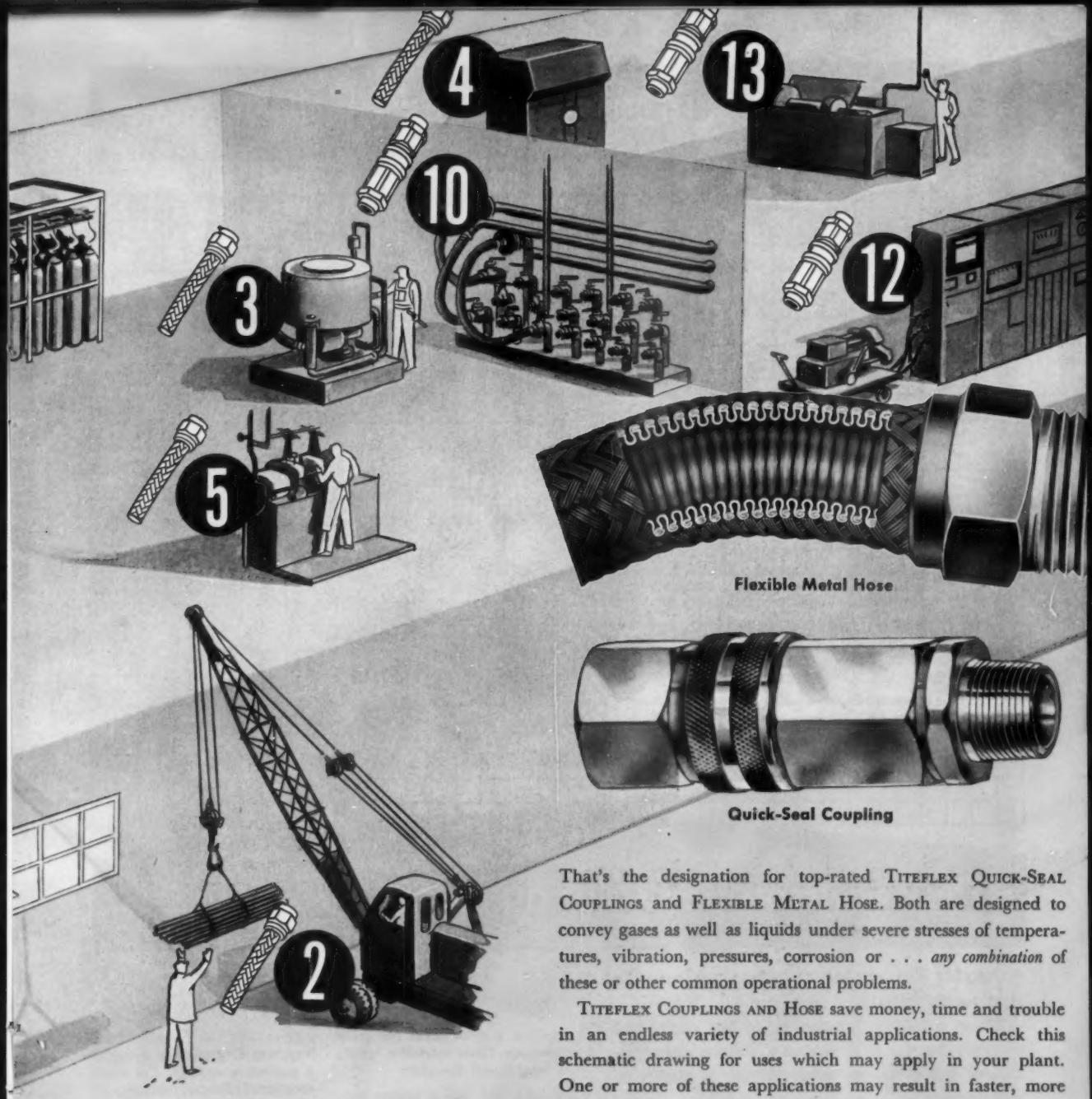
1. Fire Extinguisher
2. Air Control Lines
3. Cleaning Vats
4. Air Conditioning Units
5. Milling Machine
6. Hydraulic Press—Lubricating Lines
7. Steam Lines

COUPLINGS USED FOR—

8. Tank Car Unloading
9. Furnace Doors
10. Blending "Switchboards"
11. Lift Trucks—Hydraulic Lines
12. Mobile Testing Equipment
13. Machine Cleaning
14. Air Lines for Tools

Titeflex

TITEFLEX Couplings Metal Hose for any corrosion, temperature, vibration, or pressure problem



Flexible Metal Hose

Quick-Seal Coupling

That's the designation for top-rated TITEFLEX QUICK-SEAL COUPLINGS and FLEXIBLE METAL HOSE. Both are designed to convey gases as well as liquids under severe stresses of temperatures, vibration, pressures, corrosion or . . . *any combination* of these or other common operational problems.

TITEFLEX COUPLINGS AND HOSE save money, time and trouble in an endless variety of industrial applications. Check this schematic drawing for uses which may apply in your plant. One or more of these applications may result in faster, more efficient, cost-saving uses in your plant operation.

Use coupon below for additional information. Your Titeflex representative will be glad to advise you.

QUICK-SEAL COUPLINGS

- *Absolutely* leakproof
- Couple-uncouple in ONE second—*without* tools
- Allow *free* flow
- 360° swivel—no kinking of hose
- Straight-through or single or double check-valve types
- Sizes—¼" to 12"

FLEXIBLE METAL HOSE

- All-metal construction
- Corrosion, vibration resistant
- Braided or unbraided, in many alloys in many sizes or fittings
- Simplifies design and installation problems
- Conveys gases or liquids within a broad temperature range for *innumerable* applications

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Please mail product literature—no obligation

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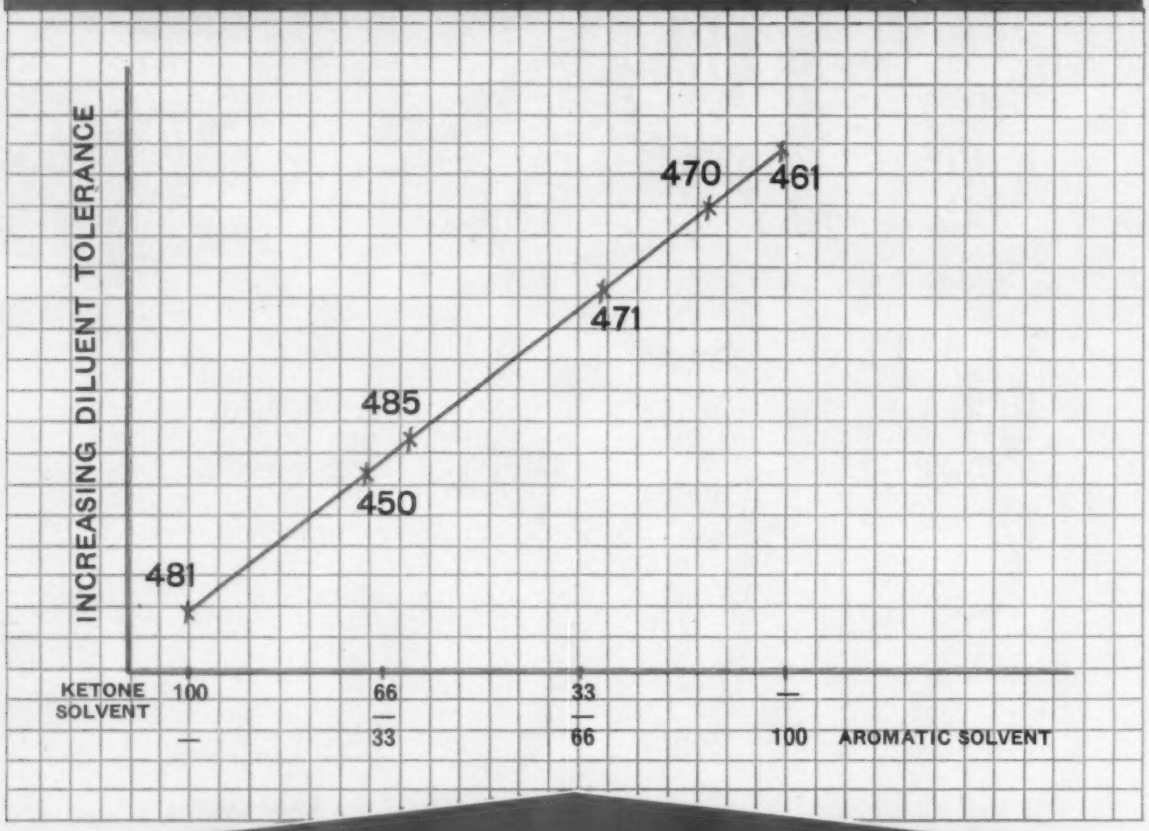
in all industrial plants

EXON SOLUTION RESINS—VINYL CHLORIDE TYPE



Pick your proper solution resin...*at a glance!*

• Another Firestone service to help you make the right resin choice!

These 6 EXON solution resins are engineered precisely, varying in properties to suit various applications and uses—but never varying in quality of performance.

Further product details at right. Keep this chart handy to help you choose easily and accurately.

EXON 450 — Ideal for strip coatings. Good solubility, tensile strength and durability.

EXON 461 — A unique fluorine-containing resin combining high solubility, unusual chemical resistance, heat stability and weatherability.

EXON 470 — Excellent adhesion to metals, alkyd and vinyl surfaces. Compatible with wide range of drying oils, alkyds, phenolics, melamines. High solubility in inexpensive solvents.

EXON 471 — Excellent for weatherability and durability in a protective coating. Corrosion resistant. No measurable change after sunlamp exposure for 360 hours as 1 mil film.

EXON 481 — Makes possible colorful, abrasion-proof, washable coatings that resist fading or cracking.

EXON 485 — For superior strip coatings. Lower viscosity makes application easier and shelf-life better. Good clarity.

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EXON®

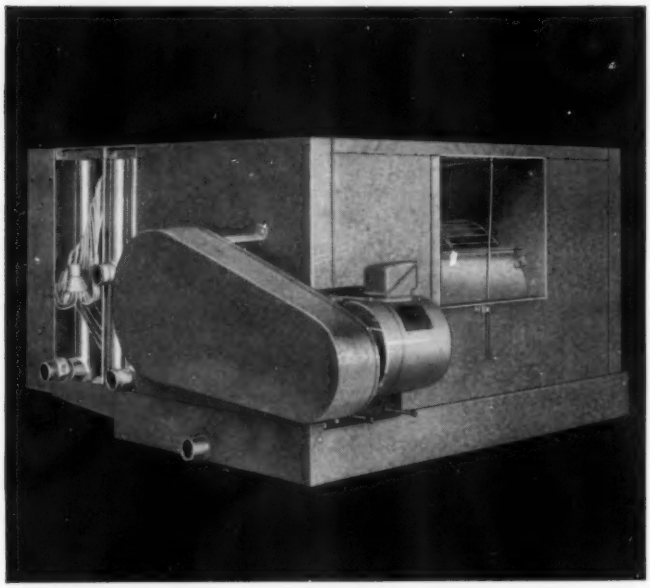
For complete information and technical service, call or write:

CHEMICAL SALES DIVISION

FIRESTONE PLASTICS COMPANY, DEPT. 615J POTTSTOWN, PA. • A DIVISION OF THE FIRESTONE TIRE AND RUBBER COMPANY

For more facts circle 511 on Reply Card

AMERICAN BLOWER OFFERS FLEXIBILITY AND HIGH EFFICIENCY IN EQUIPMENT TO AIR CONDITION ANY SPACE

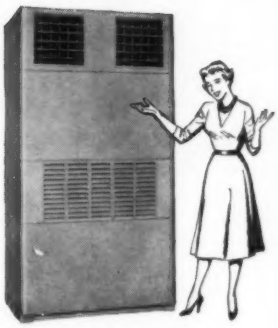


American Blower central-station cabinet-type air conditioning units cool and dehumidify in summer using chilled water, direct-expanded refrigerants, or brines; and heat and humidify in winter with steam or hot water. Quiet slow-speed fans, aileron air-volume adjustment, and air-mixing dampers combine high efficiency with accurate control to assure perfect year-round temperatures at low operating cost.

Built in sections of heavy-gauge zinc-coated steel, these units resist corrosion, make handling and erection easier. Filter boxes, piping, air discharges, and standard motors can be positioned *during installation* to meet requirements exactly. They occupy a minimum of space relative to output (capacities: 600 cfm to 48,000 cfm), and are available in horizontal or vertical arrangements, for floor or ceiling mounting.

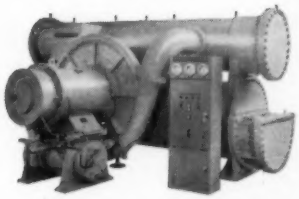
For full details on American Blower air conditioning equipment—contact our nearest branch office, or write us direct.

Whatever type air conditioning system you plan, we have equipment to meet your exact requirements



Packaged Air Conditioners—Durably finished, quiet operating, 3- thru 20-ton capacities.

Diaflo Room Units, for floor or ceiling mounting, offer exclusive fan design, throwaway or cleanable-type filters. Enclosures lift off by hand.



Tonrac —Single-Stage Hermetic Centrifugal Refrigerating Machines have few moving parts, install on single level. Completely self-contained.

American Blower products serve industry

- Air Conditioning, Heating, Ventilating Equipment
- Mechanical Draft Equipment
- Industrial Fans and Blowers
- Centrifugal Compressors
- Gyrol Fluid Drives
- Dust Collectors
- Refrigerating Machines

AMERICAN BLOWER CORPORATION, DETROIT 32, MICHIGAN
CANADIAN SIROCCO COMPANY, LTD., WINDSOR, ONTARIO

Division of American-Standard

AMERICAN BLOWER

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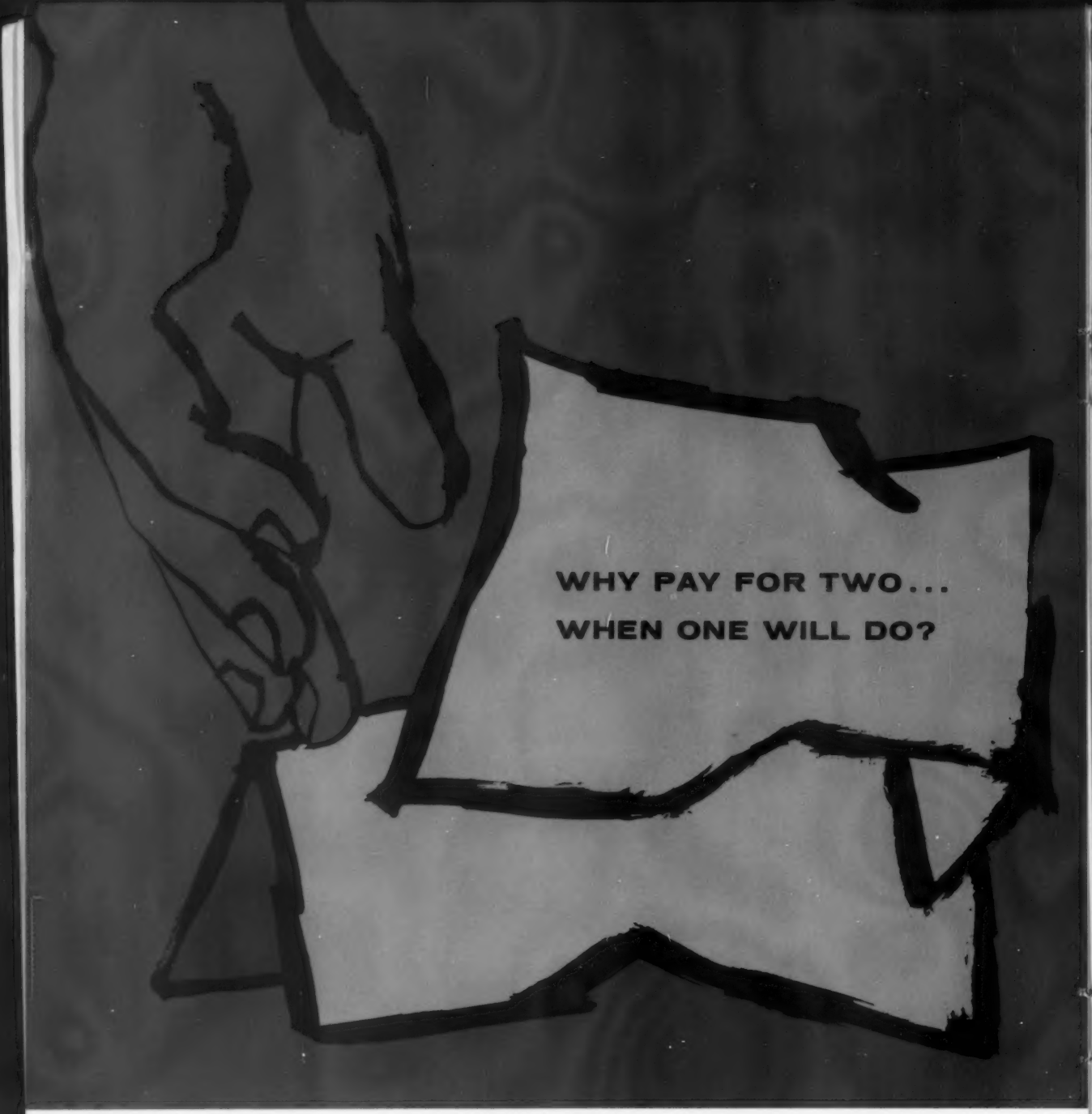


Fist test helps you see why Scott Towels cut towel consumption

Try this: Put your fist into a Scott Towel, see how it stretches and conforms to your hand—the drying surface comes into play instantly. This makes for thorough drying. The result: one Scott Towel is used instead of two or more.

Inferior towels go to pieces when they're wet. It takes two, three—a fistful to dry both hands. Consequently, consumption is high, cost is high.

Not so with the quality Scott Towel. It's been designed for whiteness, softness—and most of all—absorbency. One Scott Towel dries two hands quickly and comfortably. There's no extra consumption, no extra washroom maintenance—cost is at a minimum.

Scott is the brand of towel your people buy for home more often than any other brand.

Give your local Scott representative or distributor a call today. Let him show you how you can determine the cost-reducing possibilities of Scott Towels in your washrooms.

Another quality product of . . .

SCOTT PAPER COMPANY

75,000-gal. Horton elevated water tank at Gerber Products, Inc., Rochester, N. Y.

UNIQUE HORTON WATER TANK AT GERBER'S

It would be hard to measure the publicity value of the special Horton® water tank shown at the left, built for Gerber Products Inc. at Rochester, New York. A replica of the nationally known Gerber Baby Foods jar, it towers above the surrounding area.

This unique water tank provides a dependable, gravity pressure water supply that is always available—with the automatic plant sprinkler system, it provides maximum fire protection.

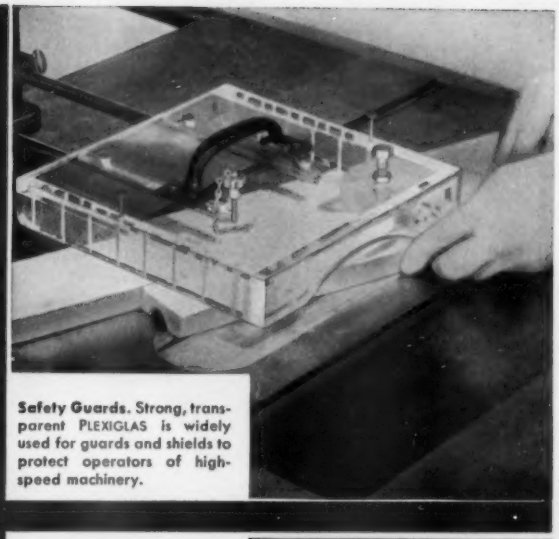
Investment wise, the water tank and plant sprinkler system will pay for themselves in approximately five years through reduced insurance premiums.

Write our nearest office for information on Horton elevated tanks of standard or unique design.

Chicago Bridge & Iron Company

Atlanta • Birmingham • Boston • Chicago • Cleveland • Detroit • Houston
Los Angeles • New York • Philadelphia • Pittsburgh • Salt Lake City
San Francisco • Seattle • Tulsa
Plants in BIRMINGHAM, CHICAGO, SALT LAKE CITY and GREENVILLE, PA.

Glazing. PLEXIGLAS windows in this steel plant control room resist breakage from impact and vibration.



Safety Guards. Strong, transparent PLEXIGLAS is widely used for guards and shields to protect operators of high-speed machinery.

Covers. Thermoplastic PLEXIGLAS can be formed into covers and hoods that protect materials in process from contamination.

Inspection Windows. Panels of rugged PLEXIGLAS built into machinery permit observation of equipment in operation.

Plexiglas—useful in so many ways around the plant

PLEXIGLAS® acrylic plastic can do many important jobs around a plant. The examples shown above indicate just a few of the ways it is being used to solve safety, maintenance and operating problems.

Put these advantages of PLEXIGLAS to work in *your* plant:

- Great strength, light weight and crystal-clear transparency.
- Resistance to corrosive atmospheres.
- Excellent electrical properties.
- All-weather durability.
- Formability to almost any shape.
- Machining characteristics like those of wood or soft metals.

PLEXIGLAS R, the lower-cost grade, is especially suitable for industrial plant applications. Call your nearest dealer for information and quick delivery. Dealers are listed under PLEXIGLAS in classified telephone directories of most large cities.

Send for this free booklet.

PLEXIGLAS Design and Fabrication Manual tells how to work with cast acrylic plastic sheets.

Chemicals for Industry

ROHM & HAAS COMPANY

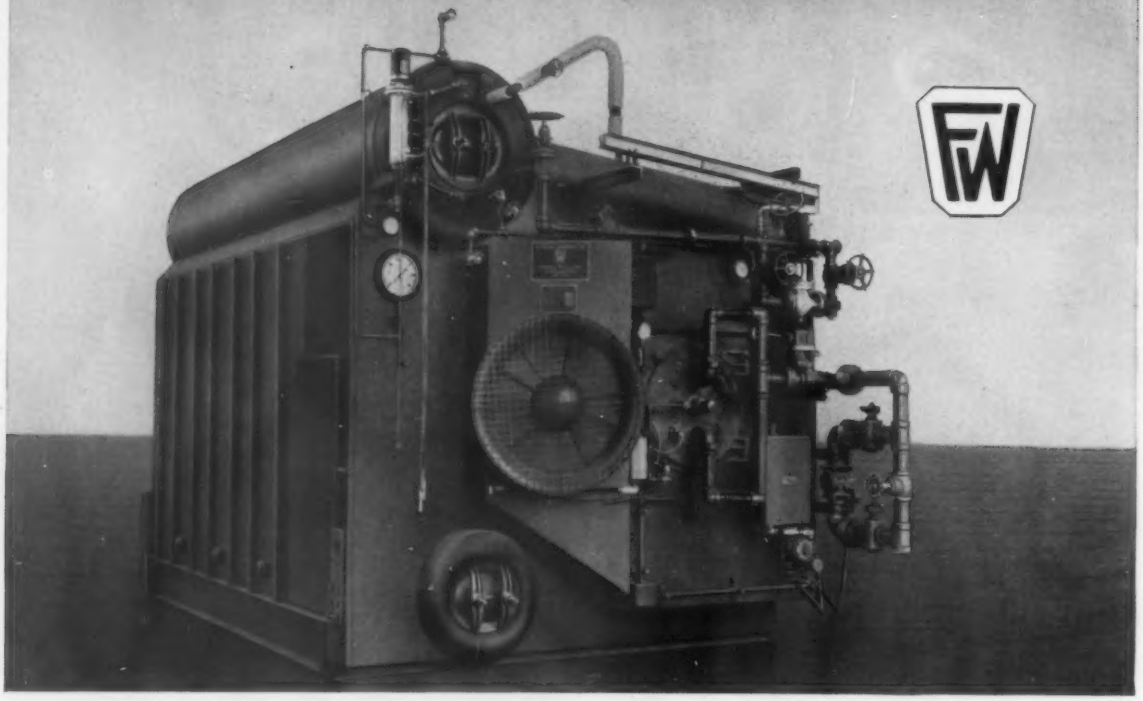
WASHINGTON SQUARE, PHILADELPHIA 5, PA.

Representatives in principal foreign countries

Canadian Distributor: *Crystal Glass & Plastics Ltd., 130 Queen's Quay at Jarvis Street, Toronto, Canada.*

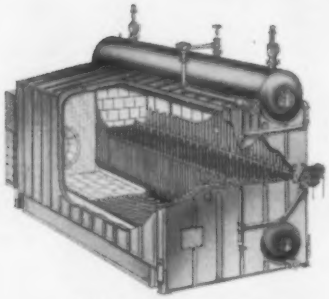
For more facts circle 515 on Reply Card

REDUCE YOUR STEAM COSTS THREE WAYS



with the New Foster Wheeler

PACKAGED STEAM GENERATOR



CONSTRUCTION FEATURES

- 36" steam drum and 24" water drum
- Staggered boiler tube arrangements
- Closely spaced waterwall tubes
- Water cooled target wall
- No headers — Low circulation loss
- Light, highly efficient refractory and insulation
- Wide choice of burners and controls
- Baffled steam collector

YOU save on *first cost* because the FW unit is pre-engineered and shop fabricated from standard parts by the most modern, efficient and cost-saving production methods.

You cut *installation cost*, with a compact, space-saving unit that's shipped completely assembled — all ready to set on a simple foundation — all ready for your fuel, steam and electric connections.

You save *operating cost* all year 'round, because FW Packaged Steam Generators are designed for high sustained efficiency and exceptional ease of inspection and maintenance.

The NEW Foster Wheeler Packaged Steam Generators, in capacities from 10,000 to 46,000 lb/hr, represent the last word in modern steam plant design, reflecting more than 50 years of service to the power generation industry.

For complete details, send for Bulletin No. PG-55-3.
Foster Wheeler Corporation, 165 Broadway, New York 6, N.Y.

FOSTER WHEELER

NEW YORK • LONDON • PARIS • ST. CATHARINES, ONT.

For more facts circle 516 on Reply Card

BULLETINS just released and of immediate plant interest

On pages 187-188 are two postage-free Reader Service Cards provided for your convenience in ordering these bulletins. You may also use the cards to order any literature mentioned in ads.

PUMPS, PUMPING

101 **Steam Pump Care**—Bulletin G-2280, "How to Install and Take Care of Steam Pumps," is a 24-pp booklet containing a step-by step series of 88 illustrations showing how to increase the service life of all types of steam pumps. It offers 28 tips on proper installation of the pumps, 54 tips on care techniques. Section on installation provides information on suction, pump, packing pump, starting, and trouble shooting. Section on maintenance deals with such subjects as steam valves, liquid piston and rod, piston packing, liners, valve service. Worthington Corp.

102 **Chemical Pumps**—Bulletin 1050 details features and specifications of company's canned motor pumps for general process pumping. Included are performance curves, dimensions, principles of construction and operation, cutaway views, materials available, power requirements, other material. Chempump Corp.

103 **For Hydraulic Services**—A solution to pump up-keep problems is presented in 8-pp Form 7248-A describing maintenance-free pumps for hydraulic service. Includes cutaway photos showing important features and pictures typical installations. Specifications, interchangeability table, and dimensional data are included. Ingersoll-Rand.

104 **Meter that Pumps**—Bulletin 300, 8 pp, describes company's improved meter that pumps —designed for precise metering and proportioning of small quantities of low viscosity fluids at low cost, over extended periods of time. Complete capacity tables and a detailed schematic are also included. Hills-McCanna Co.

105 **For Ash Handling**—Twelve-pp Data Sheet Pa contains general description and engineering data on company's improved Hydroseal pumps for hydraulic ash handling systems. Photos, schematics and line drawings illustrate design, construction and operation of these abrasion resistant centrifugal pumps. Tables give capacities and related data, including friction loss in pipe, fittings. Cutaway shows operation. The Allen-Sherman-Hoff Co.

HEATING

106 **Gas Heating Equipment**—Comprehensive Catalog GN-56, 24 pp, presents suspended gas unit heaters, both fan and blower types, in capacities from 25,000 to 250,000 Btu; a deluxe suspended unit heater; a floor model; duct furnaces; and a horizontal furnace. In addition to specifications, construction details and dimensions, drawings and tables, catalog also provides installation information and application ideas. Reznor Mfg. Co.

107 **On Unit Heaters**—Latest improvements, specifications and performance data for Herman Nelson horizontal and vertical unit heaters are covered in 36-pp Bulletin 700A. Includes complete hot water and steam performance tables, dimensions, selections, applications, descriptions of cabinets, elements, motor mountings, fans and accessories, controls. Also provided are suggested layouts, piping diagrams, other data. American Air Filter Co., Inc.

108 **Heating Cable**—Ten pp Bulletin 19-675 contains product, application and installation information and collateral data to help in selection of heating cable for any specific job. Three types are discussed: silicone rubber-insulated with lead jacket; asbestos-insulated with lead jacket; and silicone rubber-insulated with silicone rubber jacket. Typical applications, installation diagrams and conversion tables are included. General Electric Co.

VALVES, PIPING, FITTINGS

109 **Manual, Automatic Valves**—Design and operating principles of company's manual and automatic valves especially designed for tough jobs are featured in this 20-pp bulletin. Performance and engineering data, material specifications, and cutaway views of various types of valves are included. P-K Industries.

110 **Ring Gate Valve**—Circular V-126 describes a new development in valves, company's renewable seat ring gate valve, which never has to be removed from the line to replace seat rings. Photos describing how seat rings are replaced without removing valve body from line are included, along with cutaways and details. The Fairbanks Co.

111 **Non-Return Valves**—Six-pp Bulletin S-2 describes and illustrates company's Cushioned single-acting non-return valves. Discusses adaptability, sequence of operation and servicing of these valves. Body and yoke patterns available are shown, and dimensions and specifications provided. Golden-Anderson Valve Specialty Co.

112 **Pipe for Modern Buildings**—This 16-pp booklet discusses wrought iron pipe for modern buildings. Identifies wrought iron pipe and describes composition and advantages. Included are sections on wrought iron's resistance to corrosion and fatigue stresses, weldability, forming and threading, as well as the application of protective coatings to the material. Pictures and sketches illustrate applications. A. M. Byers Co.

113 **Plastic Pipe, Fittings**—Two types of unplasticized PVC pipe and fittings are described in 6-pp Bulletin T.D. 119, a normal impact grade and a high impact grade. Advantages of both types are given. Applications are listed by industry and process, and the full range of corrosion resistance is defined. Tables show physical properties, dimensions and weights, working pressures, burst pressures, other data. Installation instructions included. The Carpenter Steel Co.

114 **PVC Pipe, Fittings**—Bulletin 51155, 12 pp, describes company's corrosion resistant polyethylene and polyvinyl chloride pipe, tubing, ducting, valves and fittings for industrial applications. Information includes a summary of pipe materials; fabricated pipe fittings data; details on larger dimensions of cast pipe; properties of company's pipe; list of literature available. Photos and drawings supplement text. American Agile Corp.

115 **Pipe Nipples**—Catalog 708B describes flexible pipe nipples for strain-free connection of air or gas lines to industrial oil or gas burners. Includes chart showing how to select required length of bellows for special flexible nipples. Also details advantages of company's product and includes specifications. Hauck Mfg. Co.

116 **For Process Industry**—Bulletin TB-410, 8 pp, deals with use of seamless and welded stainless steel pipe and stainless steel welding fittings in the process industry where corrosion and/or elevated temperatures are determining factors. Contains application data on widely used stainless steels and furnishes helpful hints on the bending, joining and welding of these products. Tubular Products Div., The Babcock & Wilcox Co.

DUST AND FUME CONTROL

117 **Reduced Cleaning Costs**—How an office building saved $18,000 a year in maintenance costs is told in 12-pp Bulletin 250-A-1. Tells how filters, installed when the air conditioned building was constructed in 1940, proved inadequate, and were replaced in 1947 by nine systems of Electro-Matic self-cleaning electronic precipitators. Elimination of smoke and fine dust, reduced cleaning costs, and other benefits of this equipment are detailed. American Air Filter Co., Inc.

118 **Fans for Severe Service**—Industrial fans designed to handle corrosive and explosive fumes, high temperatures and humidity, abrasive dusts and dirt-laden air, are featured in 6-pp Bulletin 620. Discusses applications for the belt-driven tubeaxial fans and requirements for use under special conditions. Fully illustrated, bulletin covers construction features, accessories, bearing assemblies and performance of five sizes with air delivery ratings to 26,000 cfm. Propellair Div., Robbins & Myers, Inc.

MECHANICAL POWER TRANSMISSION

119 **V-S Transmission**—How to provide simple, direct, low cost speed adjustment for all machines using V-belts is told in this 12-pp bulletin. Describes operation of company's variable speed transmissions, and includes dimension charts, drive data, application chart, selection formula, other information. Maurey Mfg. Corp.

120 **Agitator Drive**—Bulletin 931, on operation and maintenance of company's PW drive for agitators used in chemical processing, gives tips on motor installation and maintenance, charts recommended horsepower, and shows suggested agitator speeds. Operating instructions and lubrication techniques are also given. Text and drawings also indicate methods for belt alignment and length, and for control of speed and load capacity of variable speed sheaves. The Pfaudler Co.

121 **Variable, Combination Pulleys**—Catalog 60A, 18 pp, illustrates and describes company's variable pulleys and combination pulleys, including accessories. Rating and dimension tables are designed to facilitate selections. Lewellen Mfg. Co.

122 **High-Speed Reduction Gears**—Descriptive Bulletin DB 1165 features high-speed reduction gears for mechanical-drive steam turbines having capacities from 50 to 5000 hp. Illustrated bulletin describes various parts of gear assembly, lists dimensional and weight specifications, and includes drawings of assembly. Westinghouse Electric Corp.

123 **Power Take-Offs**—Bulletin 308, 8 pp, provides horsepower and torque capacities, side pull limitations, and dimensions for all of company's friction power take-offs, designed especially for today's high-speed, high-output industrial engines. They range from 95 to 602 hp in capacity. Twin Disc Clutch Co.

124 **Electric Brakes**—Eight-pp Bulletin WEB 6212 describes primary electric brakes, clutches, and clutch-brakes which utilize an electro-magnetic principle to provide a simpler, more versatile way to control a wide variety of machine motions. Includes complete specifications, cutaway views and photos showing component parts. Warner Electric Brake & Clutch Co.

125 **Precision Roller Bearings**—Data on sizes, capacities, and mounting details for precision roller bearings is contained in Bulletin H-54A, 58 pp. Items covered are company's Series SR and SE Multirol bearings; Series CF, SCF, and CYR Camrol bearings; and Series MT, SG and CT Guiderol bearings. Also described are band-saw guide wheels. Seal combinations available are also covered. Dimensions, load capacities, and recommended uses for these bearings are listed. A special feature of this handbook is a chart listing stock numbers of interchangeable bearings made by this and other manufacturers. McGill Mfg. Co., Inc.

CONSTRUCTION

126 **Steel Beams**—Advantages of company's light hot-rolled steel structures are outlined in this illustrated 22-pp bulletin. Applications in various types of building construction are covered and full specifications included. Table of spacings, dimensions, properties, connection diagrams are other features of bulletin. Jones & Laughlin Steel Corp.

127 **Framing Ideas**—Scores of ideas on using Dexion Slotted Angle are contained in this 12-pp booklet. Photos and descriptions of industrial and other applications show versatility, strength and economy of Dexion for a

BULLETINS

(Begins on page 23)

variety of plant maintenance and equipment needs. Accessories which add to its usefulness are shown, including a cutter, steel panels for shelving or stair treads, and casters. Also provided are simple instructions and tips for getting maximum use from the material. Dexion Div., Acme Steel Co.

128 On Shelving Installations—Tips on how to plan installations and order shelving in more than 1000 combinations to fit any storage or supply-handling need are summarized in this 28-pp catalog. Drawings of basic units, floor plans, self-capacity chart and photos of completed units are provided. Step-by-step drawings and photos show how this shelving can be built from simple arrangements to fully enclosed units. Three-dimensional drawings are annotated to show wide variety of shelf spacings obtainable and various depths of units. Hallowell Div., Standard Pressed Steel Co.

MATERIALS HANDLING

130 Conveyor Engineering Manual—All information needed to order and install a cable conveyor system, including a diagrammatic plan for layout and dimensional calculations, is contained in this 36-pp engineering manual. There is a separate section on the Tipp-Tronic, an automatic safety controller that provides warning and prevents damage from abnormal load conditions on electrically driven conveyor systems. Featured in this book is company's standard trolley, redesigned for easier installation and maintenance, more efficient operation. Tipp Mfg. Co.

131 Roller Conveyors—Twenty-pp Bulletin 100 (rev.) presents gravity roller conveyors designed to reduce handling time and labor. Provides photos and descriptions of a two-in-one unit that can be set for small packages or turned over and set for handling packages larger than the width of the conveyor; special units; gravity roller conveyor bearings, and aluminum gravity roller conveyors. Specialty items are also presented, including mobile tripod units; curved and inclined sections; cable reel units; limit switches and stops; others. Harry J. Ferguson Co.

132 Idler with Flex Appeal — Twelve-pp Booklet 2-15 contains design and application data for plant engineers concerned with belt conveyors to handle bulk materials. Included are descriptions, dimensional drawings, specification tables and suggested applications for Limberoller idlers and various troughing, impact, training and return brackets to use with belt widths of 18 through 72 in. The Limberoller is a flexible, single-roll belt conveyor idler suspended from a bearing at each end to form a troughing catenary. Joy Mfg. Co.

133 Industrial Wire Rope—Bulletin DH-128D, 24 pp, features wire rope recommendations for industrial services. Covers more than 120 types of wire ropes used in construction, conveyors, cranes, dredges, steel mill and blast furnaces, coal bridges, guy ropes, inclines, platform lift trucks and winch lines. Each recommendation covers such points as rope diameters, construction, preforming, lay, grade and core. In addition, charts covering weights and breaking strengths of the rope are provided. American Cable Div., American Chain & Cable Co., Inc.

134 Why Unitizing?—This 16-pp idea booklet shows in 50 practical applications how steel strapping is providing faster handling of products, savings in packaging materials, better use of warehouse space and increased product protection. Booklet deals with unitizing—grouping individual products or packages into a single unit through use of steel strapping. Applications presented include skid loading, palletizing and self-palletizing in shipment and storage of forest products, automotive products, metal working products, others. Acme Steel Products Div., Acme Steel Co.

PAINTS AND COATINGS

135 On Maintenance Painting—New spray painting products are included in 28-pp Catalog M-51, a recent edition of company's maintenance painting booklet. Among these are a spray gun used with a ½ or ¾ hp air compressor. To guide the painter, the booklet contains a chart specifying correct spray gun to be used with various classes of materials. Also provided are tips on selection of equipment for specific jobs. The DeVilbiss Co.

136 Corrosion Prevention—"Guard Against Corrosion" is a 26-pp bulletin on causes and control of corrosion. Explains seven types of corrosion and suggests methods of surface treatment for maximum corrosion control. Product information is included on Steel-Kote, Kork-Kote, an asphaltic primer, an asphaltic rejuvenator, a rubberized calking compound, a resinous aluminum coating, and Hi-Heat aluminum coating. Also provides chart showing degree of protection against 81 corrosive agents offered by these coatings. Other sections deal with use of primers and finishing of insulation. Vibradamp Corp.

INSTRUMENTS, CONTROLS

137 Temperature Controls—This 8-pp condensed catalog contains model illustrations and brief descriptions of temperature controls and allied equipment for industrial heating and refrigeration. These are applications ranging from —30 to 1200 F. Included are recording, indicating, non-indicating controls; thermometers, bulb installation accessories, process timers, gas pilots. Basic price data is provided. The Partlow Corp.

138 For Remote Transmission — Bulletin 700, 16 pp, features the Orthoflow system for accurate and rapid transmission of metering data from one location to another. Describes versatility of the system for transmission of flow data, liquid level data, or pressure measurement data, and contains diagrams of each type of application in addition to dimensional drawings and capacity charts. Simplex Valve & Meter Co.

139 Versatile Instrument — Six-pp Bulletin 301 discusses applications for, and features of, manufacturer's Transometer which comprises a positive displacement type flow meter with a pneumatic signal transmitter. Shows how the device is used for flow, ratio and combustion control; for multiple fuel totalization, and for interchangeable control in fuel switchover. Lists viscous and other liquids this intsrument will handle. Ranges, specifications and performance given. Askania Regulator Co.

140 Thermocouple Data—Bulletin F-5228-3, 40 pp, discusses construction and use of thermocouples and radiation detectors in industrial control applications. Included is information on how to check thermocouples, how to make thermocouples, and how to select and size thermocouples. Standard thermocouple temperature-millivolt equivalents with temperatures being expressed on the International Temperature Scale of 1948 are also included. Electromotive force is expressed in absolute units. Wheelco Instruments Div., Barber-Colman Co.

141 Conductivity Instruments — Catalog 1551, 20 pp, includes information about latest equipment for measuring, indicating, recording and controlling the electro-chemical variables: pH, Redox, and conductivity. Fundamentals of electro-chemical instrumentation are reviewed, and basic systems are described. Also included are illustrations of charts and control valves. Minneapolis-Honeywell Regulator Co.

142 Precision Relays—Bulletin MRM 240 features general descriptive and engineering data on precision relays for alarm signalling and on-off operation of electrical loads, for actuation by American Microsen Transmission or Control Systems signals. Design and operating specifications are included. Manning, Maxwell & Moore, Inc.

143 Pyrometers, Thermometers — Bulletin GEC-1324A describes features, accessories, application, specifications and special calibration of instruments for temperature indication and control of processes. General Electric Co.

144 Feedwater Controller — Bulletin 5623 suggests a practical solution to out-of-bounds initial, operating and maintenance cost of boiler water level control. Points out advantages of the feedwater controller and lists typical specification. The C. E. Squires Co.

145 Panel Instruments — Bulletin GEC-368H, 12 pp, describes the features, application, construction, dimensions and other data of 2½-, 3½- and 4½-in. sizes of panel instruments and accessories. Includes tables listing physical, operational and electrical data, and includes dimensions and panel-drilling plans. General Electric Co.

146 Outdoor-Type Heat Controls—"Modern Control of Building Temperatures from Outdoors" describes outdoor-type automatic heat controls. These include: time switches, set automatically by outdoor weather; controls in which outdoor temperatures automatically regulate hours of building heat generation and rate of heat flow; indoor-outdoor controls. Automatic Devices Co., Inc.

147 Leak Detector—Bulletin GEC-233F, 8 pp, describes features, specifications, and operation of a portable instrument for locating leaks in closed systems. Applications are also described. General Electric Co.

148 H_2S Detector—Development of an improved type hand-operated detecting instrument for hydrogen sulfide, one of the most toxic of the more common industrial gases, is announced in Bulletin 0805-1. Describes principle of operation, how to make test, and includes cutaway view showing component parts. Mine Safety Appliances Co.

149 Automatic Oscillograph—Bulletin GED 3049, 16 pp, gives all the facts and figures on this fully automatic instrument for monitoring power system transmission circuits. Outlines seven features which assure quality performance and convenience and includes specifications and a schematic diagram of oscillograph operation. General Electric Co.

LUBRICATION

150 Lubrication, Coolant Systems — Illustrated Bulletin 1450 describes company's lubrication and coolant systems and contains pictures of typical installations and a diagram of a mill lubrication system. Also describes a compact "packaged" lubrication system designed to meet the need for an economical, full pressure feed lubrication system in capacities to 50 gpm. Dravo Corp.

Reader Service Cards for ordering bulletins are on pages 187-188. Be sure to include your name, job title, and company.

151 Oil Controls, Oilers—Circular 580 presents company's Alvor constant level oil controls, bottle oilers for plain bearing lubrication; glass body oil cups, and aluminum body oil cups. Fully illustrated, circular includes detailed dimensions and installation instructions covering a wide range of applications. Lunkenheimer Co.

ELECTRICAL

152 Explosion Proof Motors — Bulletin GEA-6341, 8 pp, discusses design features and maintenance of new induction motors, one through 30 hp, for use in hazardous locations. Photos illustrate text. General Electric Co.

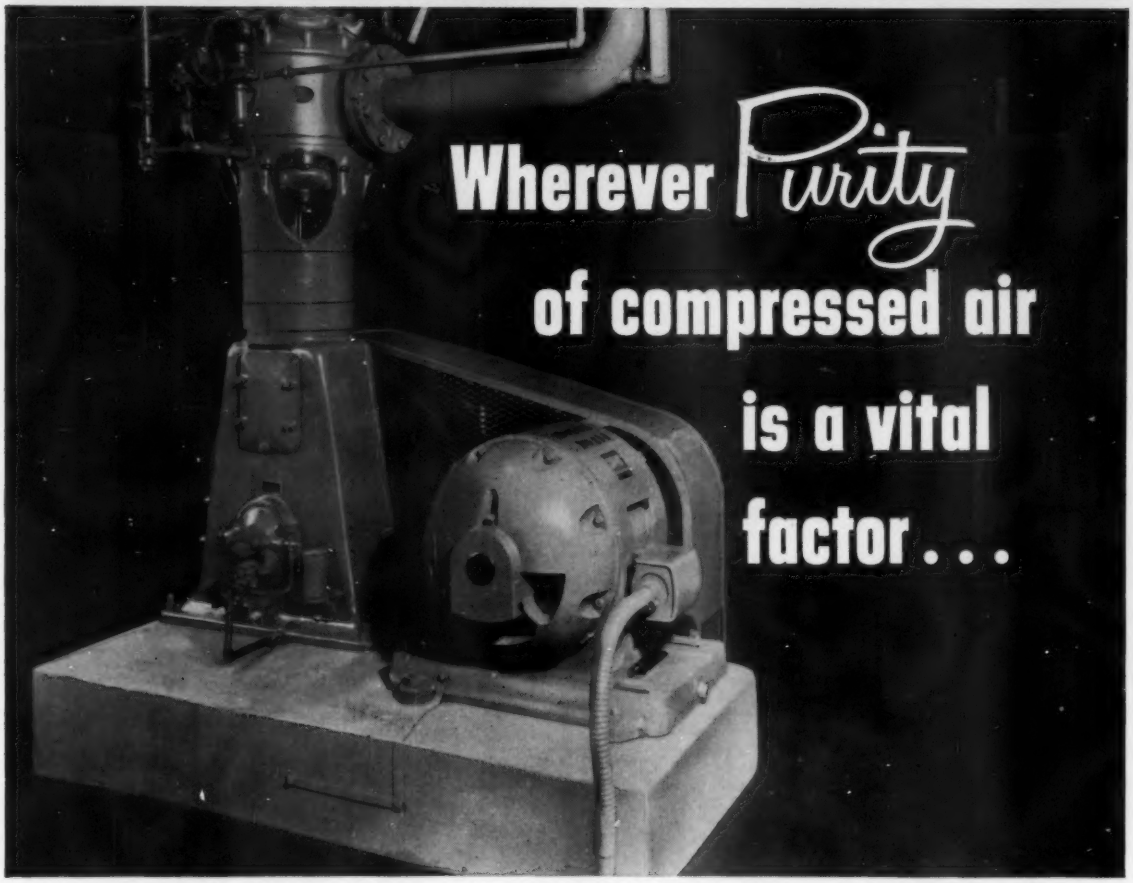
153 Permanent Magnet Motors — Catalog F-4344-3 describes company's line of fractional horsepower d-c permanent magnet motors as well as gearheads, centrifugal blowers, and tachometer generators, designed for industrial applications with many combinations of voltage, output, and speed. Specifications are tabulated and motor mounting and shaft details illustrated. Barber-Colman Co.

154 Liquid-Filled Transformers—Transformers with "Chlorextol" fireproof insulating liquid for indoor installations are described in Bulletin 61B6043C. Tells how use of these transformers reduces fire hazards and eliminates vaults. Transformers described are available in ratings from 3 through 15,000 kva, 46 kv and below. Allis-Chalmers Mfg. Co.

155 Power Circuit Transformers—Bulletin P 561-16, 12 pp, features dimensions and data on power circuit transformers designed to provide the right voltage for any normal application within the operating range of the unit. Application data and wiring diagrams are included. Jefferson Electric Co.

(More Bulletins on page 189)

ELECTRONICS | FOOD PROCESSING | ANTIBIOTICS | BREWING



JOY "WG-9" OIL-FREE COMPRESSOR

Joy WG-9 oil-free compressors are equipped with carbon graphite piston rings. These need no lubrication, and compensate automatically for wear. Special lightweight pistons; large, direct air passages; and liberal water-jacketing reduce heat and minimize ring wear.

Patented Dual Cushion valves are made of corrosion-resistant materials. All wearing areas except the rings, are either chrome-plated, surface-hardened, or made of stainless steel.

The Joy WG-9 is a double-acting, water-cooled compressor designed for *continuous* service. It is full force-feed lubricated and features replaceable-on-the-job cylinder and crosshead liners. Capacity is to 881 CFM, 125 psi. This unit is available also as a lubricated machine for standard air needs or for vacuum pump service.

Joy builds regular and oil-free compressors to meet any capacity and pressure requirement. For complete details, write to ***Joy Manufacturing Company, Oliver Building, Pittsburgh 22, Pa.*** In Canada: *Joy Manufacturing Company (Canada) Limited, Galt, Ontario.*

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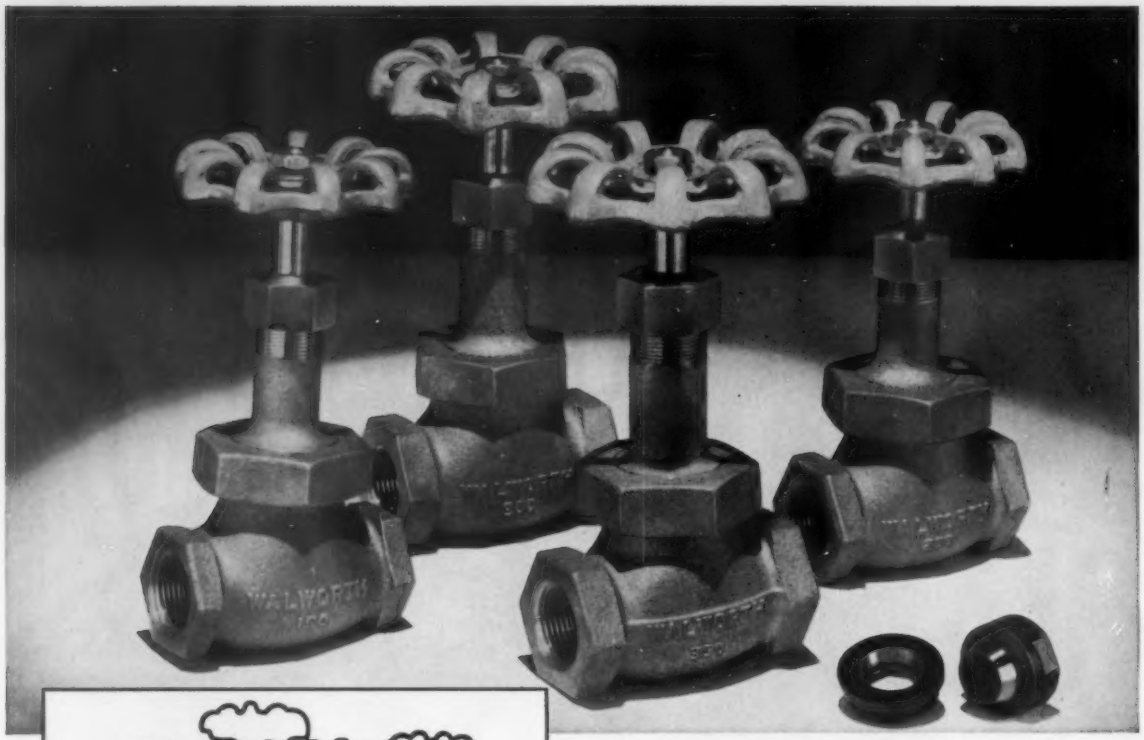

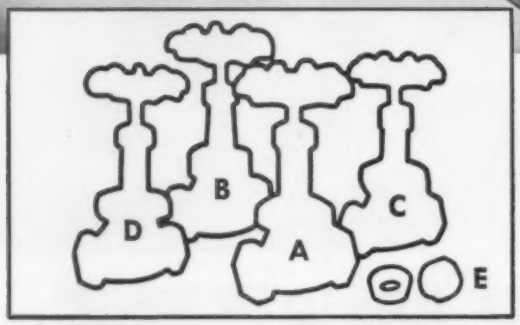

A — No. 225P.....350 WSP 550F, 1000 WOG
B — No. 260P.....300 WSP 550F, 600 WOG
C — No. 245P.....200 WSP 550F, 400 WOG
D — No. 237P.....150 WSP 500F, 300 WOG
E — "500 Brinell" Stainless Steel Plug Type Seat and Disc

Walworth offers four lines of Bronze Globe Valves with stainless steel, plug-type seats and discs. Advantages of these valves include:

• **Stainless Steel Plug-Type Seats and Discs,** heat-treated to a minimum of 500 Brinell hardness reduces wire-drawing to a minimum. Seats and Discs are machined and fitted simultaneously, assuring perfect mating.

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For Longer Bronze Valve Life . . .

"500 BRINELL" PLUG-TYPE STAINLESS STEEL SEATS AND DISCS

150 lb. 200 lb. 300 lb. 350 lb.

• **Oversize Stems,** made of high tensile strength silicon-bronze, assure long life.

• **Rugged Body Hexes,** are flat on top; do not interfere with wrench gripping body-to-bonnet union ring connection.

• **Bodies,** made of Composition M bronze (ASTM B61), have ample wall thickness to provide high safety factor.

• **Patented Handwheels** are air-cooled and designed with a "finger-fit grip." Makes turning easy even when wearing greasy gloves.

• **Identification Plates** secured by lock-washer under stem nut, show Figure Number of valves and make re-ordering sure and easy.

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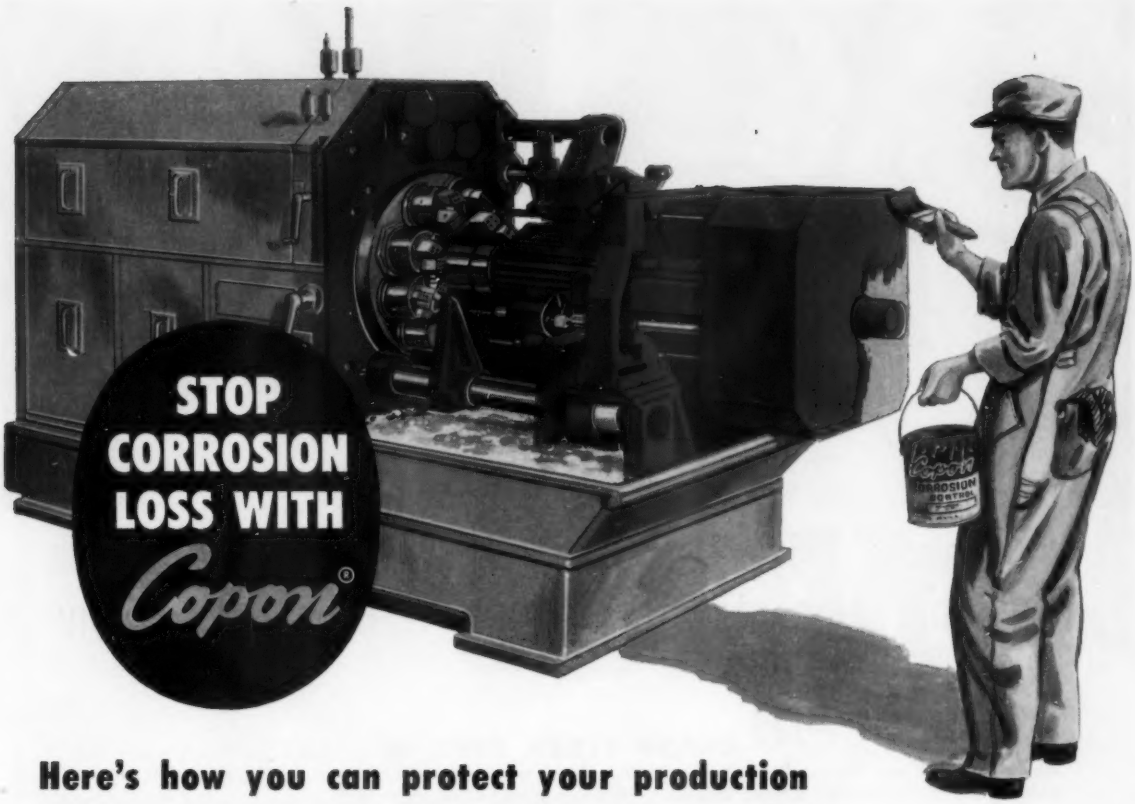

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▶ Now . . . a protective coating that will withstand even the stripping action of synthetic coolants. ACTIVATED COPON prevents corrosion damage to expensive machine tools . . . adds years of service life. Just three coats will provide long-lasting protection from constant spillage or complete immersion in coolant mixtures.

COPON coatings offer a ready solution to industry's most persistent corrosion problems. They adhere tenaciously to metal, wood, or concrete surfaces and provide outstanding protection against action of chemical fumes, chemical spillage, salt or fresh water and many other contaminating factors. Each coating is the result of extensive research and careful testing and has been designed to do a specific job.

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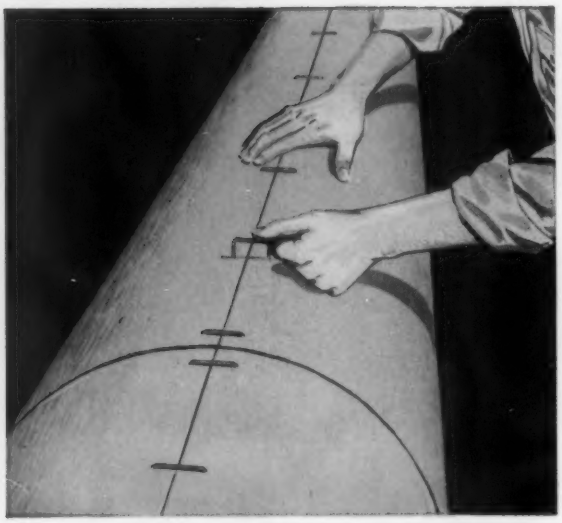

Why handle **24,948** insulation segments?...

...when you can do the job with **1,134** sections

SNAP*ON **GLASS FIBER PIPE INSULATION** vs. segmental insulation — that was the question at an eastern refinery where more than a mile of 16" pipe and its accompanying steam tracer line required insulation. A comparison of Snap*On vs. segmental yielded the following information:

- Since Snap*On comes in one-piece *6' sections*, the number of Snap*On sections would total only *1134*. To do the same job with segmental insulation would have required handling and applying *24,948 curved segments 3' long*.
- Because of Snap*On's flexibility, standard 20" one-piece sections could be used to cover both pipe and steam tracer lines in one easy operation. No special cutting, fitting or equipment would be required; not so with segmental insulation.
- Snap*On has the highest thermal efficiency of any pipe covering on the market. In addition, since joints between segments are a potential source of heat loss, Snap*On's single joint construction gives it a decided thermal advantage, especially on large pipe sizes.
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But prove to yourself just how economical G-B Snap*On is by making similar comparisons in your plant whenever hot or cold piping from ¾"-33" requires insulation. In the meantime —

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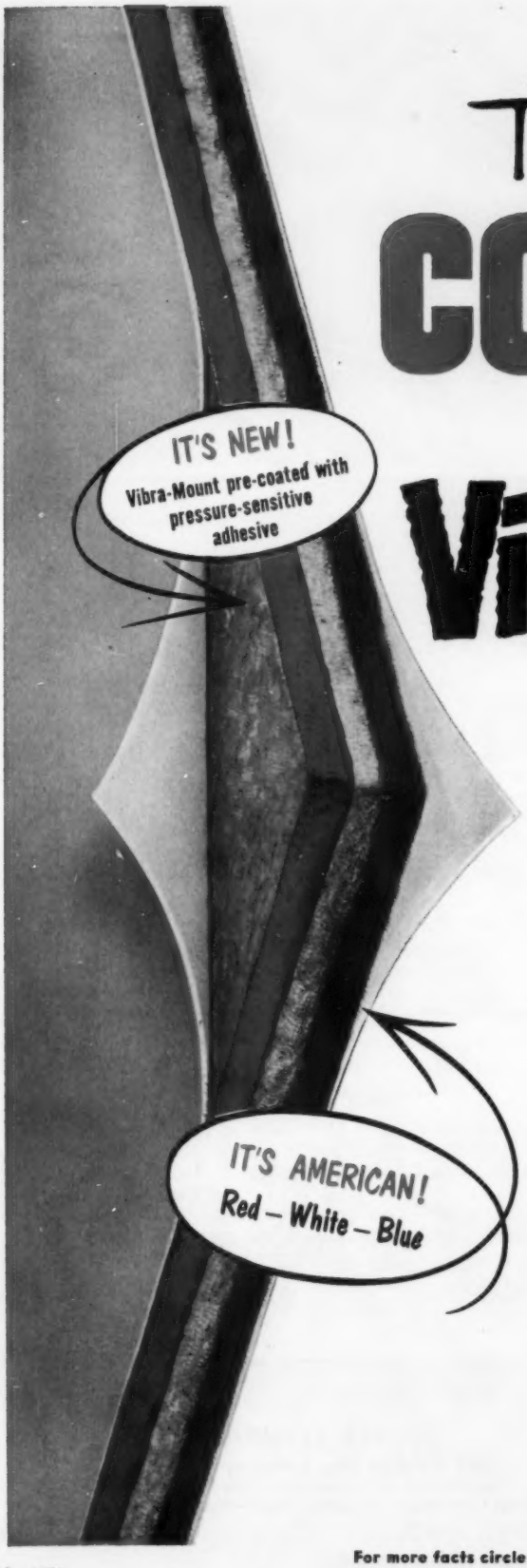

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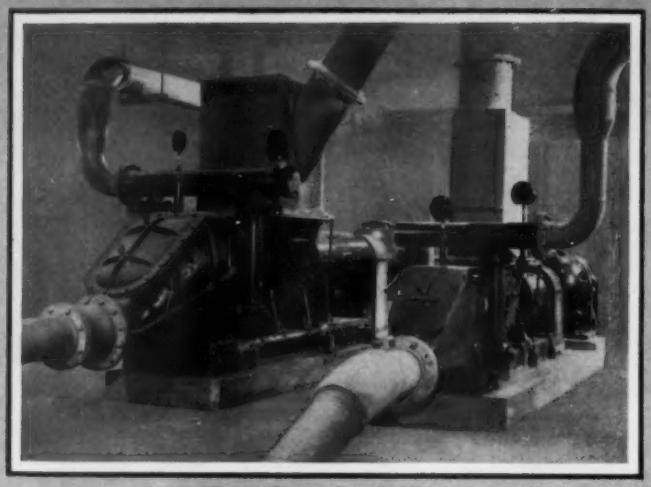

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From HERE to THERE?

Unquestionably, the best way is the way that keeps production highest and costs lowest in any plant where bulk-material handling is a basic production factor.

"Here," may be cars, trucks, ships, barges, grinding mills or storage—"there," may be packer bins, process, cars, trucks, ships or barges. If your operation involves loading, handling, unloading or all three, the Fuller-Kinyon System assures that full capacity will be maintained over the maximum conveying distance. Air does the work—safely, cleanly, efficiently. And it's versatile—you can use Fuller-Kinyon anywhere a pipeline can be run, and depending upon your requirements, it is available for remote or automatically controlled operation.

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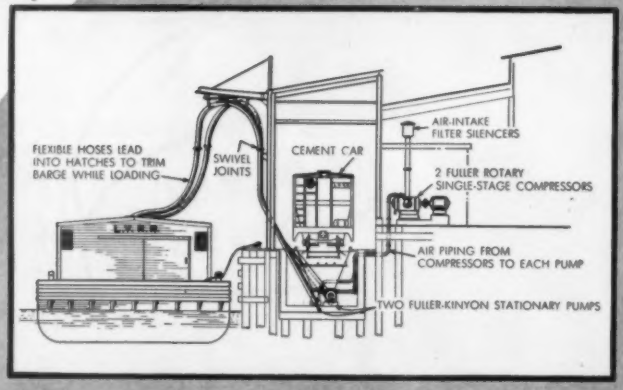
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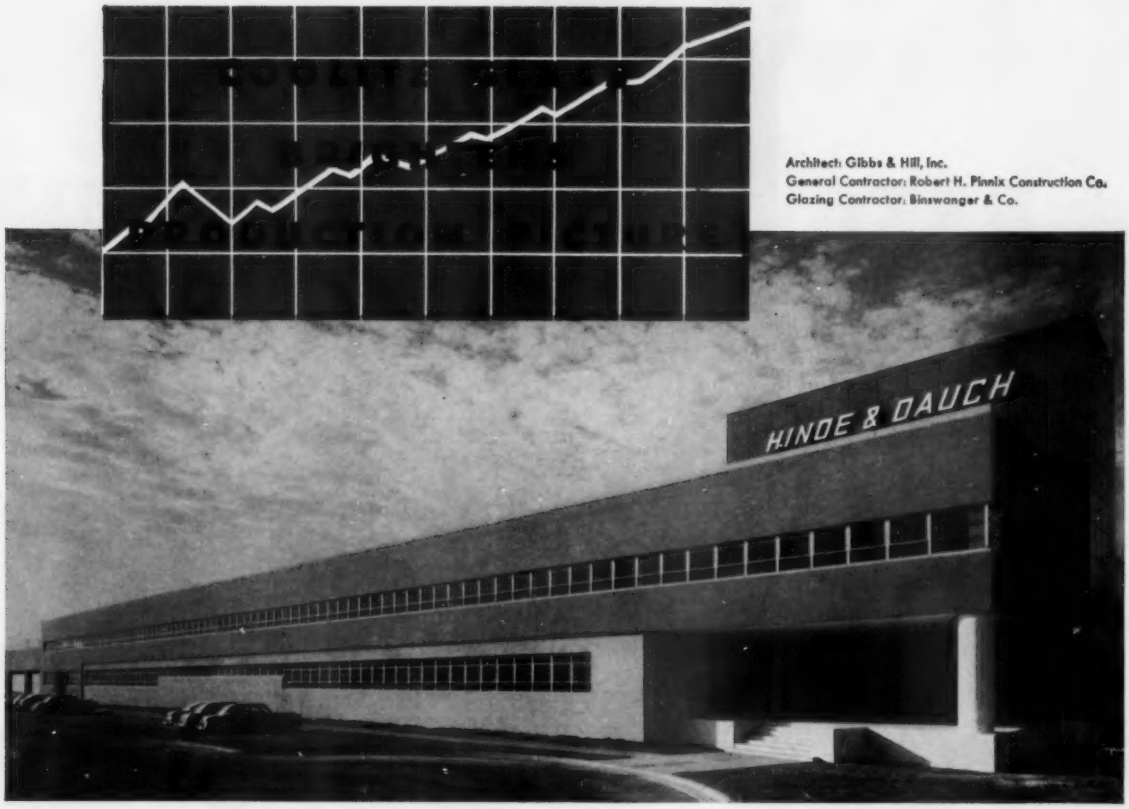

Architect: Gibbs & Hill, Inc.
General Contractor: Robert H. Pinnix Construction Co.
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Translucent, light diffusing glass by Mississippi for better daylighting, is available, wired and unwired, in a wide variety of patterns and surface finishes, all scientifically designed to distribute light to best advantage. Available at most leading distributors of quality glass.

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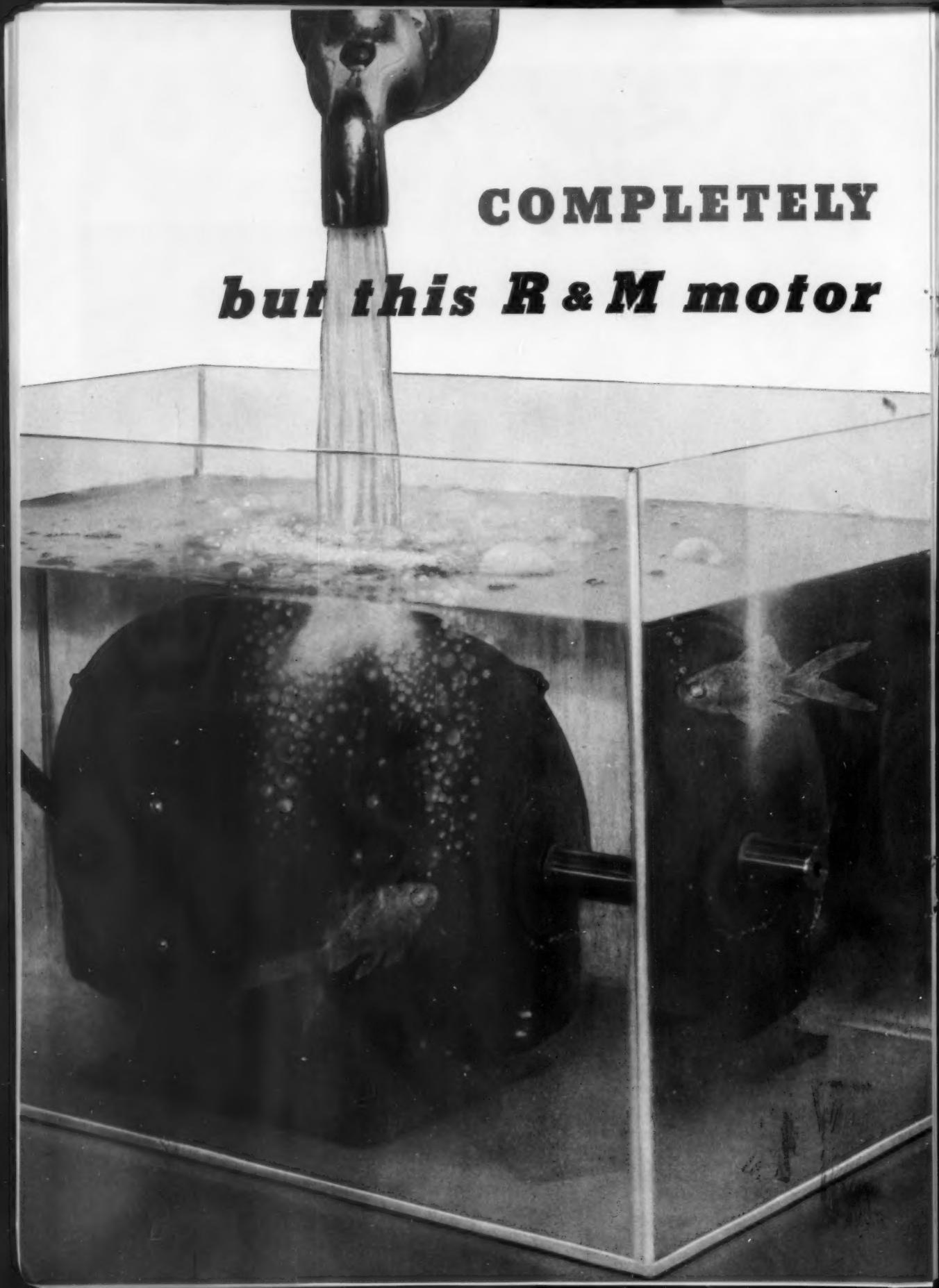
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COVERED WITH WATER

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This R&M Motor ran perfectly . . . *under* water, *after* being taken out but still wet . . . and after being dried out! It's an outstanding example of how R&M "Weatherizing" pays off in more trouble-free motor performance.

Just what is "Weatherizing"? It's a process where steel parts are undercoated with a special rust-resisting compound—dipped and then *baked* on; a method of spraying the entire shaft, the rotor and the fan to protect these parts against corrosion; a treatment for all cast-iron parts, as specified by the Armed Forces for motors used in damp or tropical locations; an elaborate system of pre-heating, dipping and baking the entire winding; special sealing of coils.

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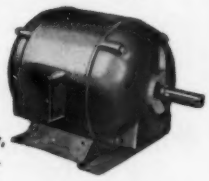
if it's an **R&M**, *it's the right motor!*

Explosion-Proof, Totally Enclosed Fan-Cooled, 1 to 40 h.p.

Frequency Converters, 2½ to 15 K.W.



Direct Current, 1 to 7½ h.p.

Capacitor Single Phase, 1 to 15 h.p.

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☐ Please send illustrated Integral Motor Catalog, showing all the extra features of R&M "All-Weather" Motors that are furnished at a standard motor price. We are also interested in:

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CHEMPRO TEFLON RING PACKING provides a frictionless, positive seal impervious to chemical attack. Chempro Styles 101 and 201 packing are available in ring sets, solid or split, to fit any pump or process equipment stuffing box.

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BACKTALK about our past issues

Edited by Marjorie E. Weissman

Microfilm Research

PLANT ENGINEERING:

"While in the process of research on microfilming, I was referred to your article on 'Hows and Whys of Microfilming' by Mr. F. Luther. This article was in the February, 1952 issue of PLANT ENGINEERING. If at all possible, I would appreciate receiving a copy of this article." *Robert L. Berardo, Design Engineer, Johnson & Johnson, New Brunswick, N. J.*

► Between clippings and a Verifax copy of one page, we were able to send Mr. Berardo a complete copy of the article he requested. If other readers are interested, we shall be glad to send them Verifax copies of this article.—*Editors.*

Ladder Safety

PLANT ENGINEERING:

"I have read with interest the article 'Ladders and Ladder Safety' on page 104 of the April, 1956, issue of PLANT ENGINEERING.

"Will you please send me a copy of the bibliography, mentioned in the article, on inspection and testing of wood and wood ladders, and safe practices in the use of ladders." *E. Troubridge, Safety Supervisor, Crown Zellerbach Canada Ltd., Ocean Falls, B. C.*

► We shall be glad to send any reader a copy of this bibliography and, while they last, a reprint of the article.—*Editors.*

New Light on Compressed Air

PLANT ENGINEERING:

"Will you please send me a tear sheet of an article which appeared in the February, 1952 issue of PLANT ENGINEERING entitled 'Compressed Air Systems—Which One Will Serve You Best?'

"I am concerned with a problem on our air system at present. Perhaps your article will enable me to view the problem in a new light." *John R. Penhallow, Maintenance Dept., Chase Brass & Copper Co., Waterbury, Conn.*

► We no longer have tear sheets of this article, but are glad to send photostats reproduced from the bound volumes of our magazine.—*Editors.*

Job Estimating Forms

PLANT ENGINEERING:

"We will appreciate your sending us a copy of the Plant Maintenance Schedule mentioned in the article 'Maintenance —According to Schedule,' on page 112 of the May, 1956 issue of PLANT ENGINEERING.

"We are also wondering if you might have or could recommend forms for the purpose of job estimating, both electrical and mechanical." *F. J. Weiss, Plant Manager, Morrison Steel Products, Inc., Buffalo 7, N. Y.*

► Copies of this schedule are still available. In addition, a booklet titled 'Industrial Maintenance' contains a number of articles illustrating forms used by various companies for record keeping. Cost of this booklet is $1.00. Another article, 'Maintenance Control—by the Clock,' which appeared in the March, 1956 issue, also illustrates forms used for job estimating.—*Editors.*

Piping Picture

PLANT ENGINEERING:

"At the top of page 83 of your May, 1956 issue, there is an excellent picture of Naylor pipe on a Carrier refrigeration machine.

"Will it be possible for you to send us a copy of this, or advise where we can secure one? We'll be glad to cover any cost involved and will be grateful for your help." *Fred H. Ebershold, President, Fred H. Ebershold, Inc., Advertising, Chicago, Ill.*

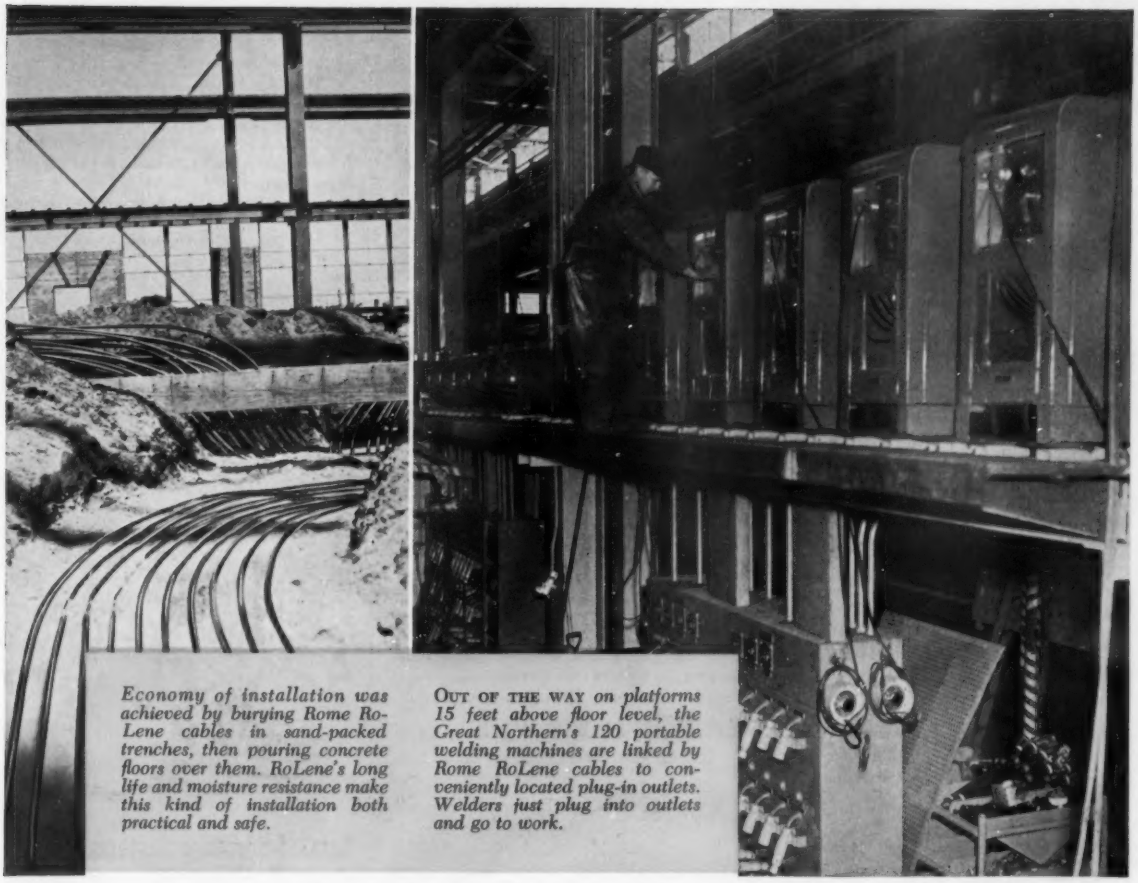
► Mr. Ebershold is entirely welcome to have our print of the photograph for his use.—*Editors.*

No Hammer Damage Here

► In the March, 1955 issue of PLANT ENGINEERING, an article authored by Howard B. Jones, Facilities Engineer, Piasecki Helicopter Corp., Morton, Pa., told how the company insulated its drop hammers to prevent vibration damage to the building, nearby equipment and operations.

An article in the March, 1956 issue of *Factory Mutual Record,* described the breakage of a sprinkler supply main at Piasecki Helicopter Corp., saying, "When building settlement and vibration of a heavy drop hammer eventually broke a nearby underground 8-in. sprinkler supply main . . . it was necessary to shut two division valves . . . "

A letter from Jack Coffin, Plant Engi-



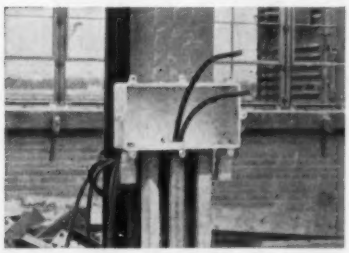
Economy of installation was achieved by burying Rome RoLene cables in sand-packed trenches, then pouring concrete floors over them. RoLene's long life and moisture resistance make this kind of installation both practical and safe.

OUT OF THE WAY *on platforms 15 feet above floor level, the Great Northern's 120 portable welding machines are linked by Rome RoLene cables to conveniently located plug-in outlets. Welders just plug into outlets and go to work.*

Electrical planning saves shop space... *speeds work flow*

In its newest building at St. Cloud, Minn., carshops, the Great Northern Railway has 120 welding machines that are never in the way . . . yet *always* handy when needed!

All these "portable" welding machines are permanently mounted on easily accessible platforms 15 feet above



floor level. Outlet panels in all areas where welding current is needed make it easy for welders to plug in and go to work.

To connect welding machines with outlet panels, they needed a cable that would last—be economical to install—and have sufficient moisture resistance to withstand the electro-osmosis effect inherent in dc distribution.

They specified 37-strand 4/0 AWG single-conductor cable with an integral insulation and sheath of Rome RoLene (polyethylene). This construction gave them the physical and electrical properties they needed, *yet was low in cost.*

RoLene's inherent moisture resistance (and mechanical toughness) gave them the installation economy they wanted, too. They simply buried 24,000 feet of this RoLene cable in sand-packed trenches and poured the concrete floor on top. Result—a completely adequate, moisture-resistant dc distribution system.

Its other virtues—mechanical toughness, good tensile strength, resistance to abrasion and elongation (and, for outdoor use, exceptional resistance to weathering)—make Rome RoLene a long-lived cable construction that's ideal for a wide range of distribution applications in modern plants.

Rome engineers are ready to help *you* put electrical planning to work on your industrial power distribution problems, too. Write or phone for prompt service.

It Costs Less to Buy the Best

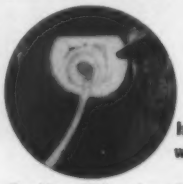
ROME CABLE Corporation
ROME · NEW YORK
and
TORRANCE · CALIFORNIA

For more facts circle 526 on Reply Card

Ask these questions, too, when you judge a fluorescent lamp . . .

Is your investment protected?

Check Westinghouse Fluorescent Lamps against any other brands you are now using. Check them for maintained brightness, long life, uniform appearance. If you are not entirely satisfied on all counts, your full purchase price will be refunded.



Is it built with tailored glass?

Quality of glass in a fluorescent lamp directly affects lamp performance. Westinghouse makes all of its own fluorescent lamp glass, tailoring it from silica to finished tubing specifically for fluorescent service.

Is it the correct type, size and color for the lighting job to be done?

In the Westinghouse fluorescent family of 290 different lamps—including Slimline and Rapid Start—there's a type and size precisely right for every office, plant and merchandising application. Colors include seven different shades of "white" alone.

For the full story on how to get more for your money in fluorescent light, contact your Westinghouse Lamp Representative. "You can be sure if it's Westinghouse."

WATCH WESTINGHOUSE!

*WHERE **BIG** THINGS ARE HAPPENING FOR **YOU!***

For more facts circle 527 on Reply Card

BACKTALK

neer, Towle Manufacturing Co., Newburyport, Mass., inquired if the drop hammer referred to in the portion of the article quoted above was the same hammer described in our March, 1955 story.

Via long distance telephone we talked to Mr. Jones of Piasecki, who explained what had happened: "The break in the main occurred about 160 ft from the hammer installation which we described [in the PLANT ENGINEERING article].

"This main was laid approximately 24 or 25 years ago at the same time the building above it was constructed by a company other than Piasecki. One of the spread footings for the building was about 6 in. directly above the main. The corner of the footing crossed the main and during the course of years, gradually settled and cut through the main just like a knife through cheese.

"It was a combination of errors on the part of both the building inspector and the original owner of the building to permit such construction.

"We have had absolutely no trouble from the installation of the hammers described in PLANT ENGINEERING."

Rehabilitation After Flood

PLANT ENGINEERING:

"We wish to acknowledge and thank you for the copy of the article devoted to the rehabilitation activities of our company following the flood of August 19, 1955.

"We think you did an exceptionally good job with this presentation and aptly described the outstanding teamwork of our employees in cleaning out our plants after the flood." *William M. Moffatt, Exec. Vice President, The American Brass Co., Waterbury, Conn.*

New Style Paint Spray Booth

PLANT ENGINEERING:

"Would you please send me more information on the Dispo disposable paint spray booth mentioned on page 52 of the May, 1956 issue of your magazine." *E. F. Spencer, Jr., General Manager, Wire Belt Company of America, Wilmington, Mass.*

▶ Requests for additional information on the Dispo paint spray booth are being forwarded to A. L. Newcomb, president of Newcomb-Detroit Co., 5741 Russell St., Detroit 11, Mich.—*Editors.*

Safety Award

PLANT ENGINEERING:

"Congratulations to your magazine for earning the National Safety Council's Public Interest Award for your contributions to public safety.

"I'm sure you feel as we do that any way that we can serve in making the American people more clearly aware of some of the cardinal rules of safety and in helping to call attention to the importance of being safety conscious is truly in the public interest.

"We at Dodge are convinced that the National Safety Council is performing a real service in acknowledging your efforts and those of others, with its Public Interest Awards. Through the awards themselves, the Council is encouraging more contributions such as yours." *W. C. Newberg, President, Chrysler Corp., Dodge Div., Detroit, Mich.*

▶ For the fifth time, PLANT ENGINEERING, along with a number of other specialized magazines, received the National Safety Council's Public Interest Award, given annually.—*Editors.*

Care of Sprinkler Systems

PLANT ENGINEERING:

"The March, 1956 issue of PLANT ENGINEERING contained an article entitled, 'Recommended Steps to Follow When Flushing Sprinkler Systems.'

"We would appreciate your furnishing us with five reprint copies of this article for distribution to our various plants in this Division." *G. A. Gerlitz, Div. Engineer, International Milling Co., Minneapolis Minn.*

▶ Additional copies of the article have been sent to Mr. Gerlitz, with our compliments.—*Editors.*

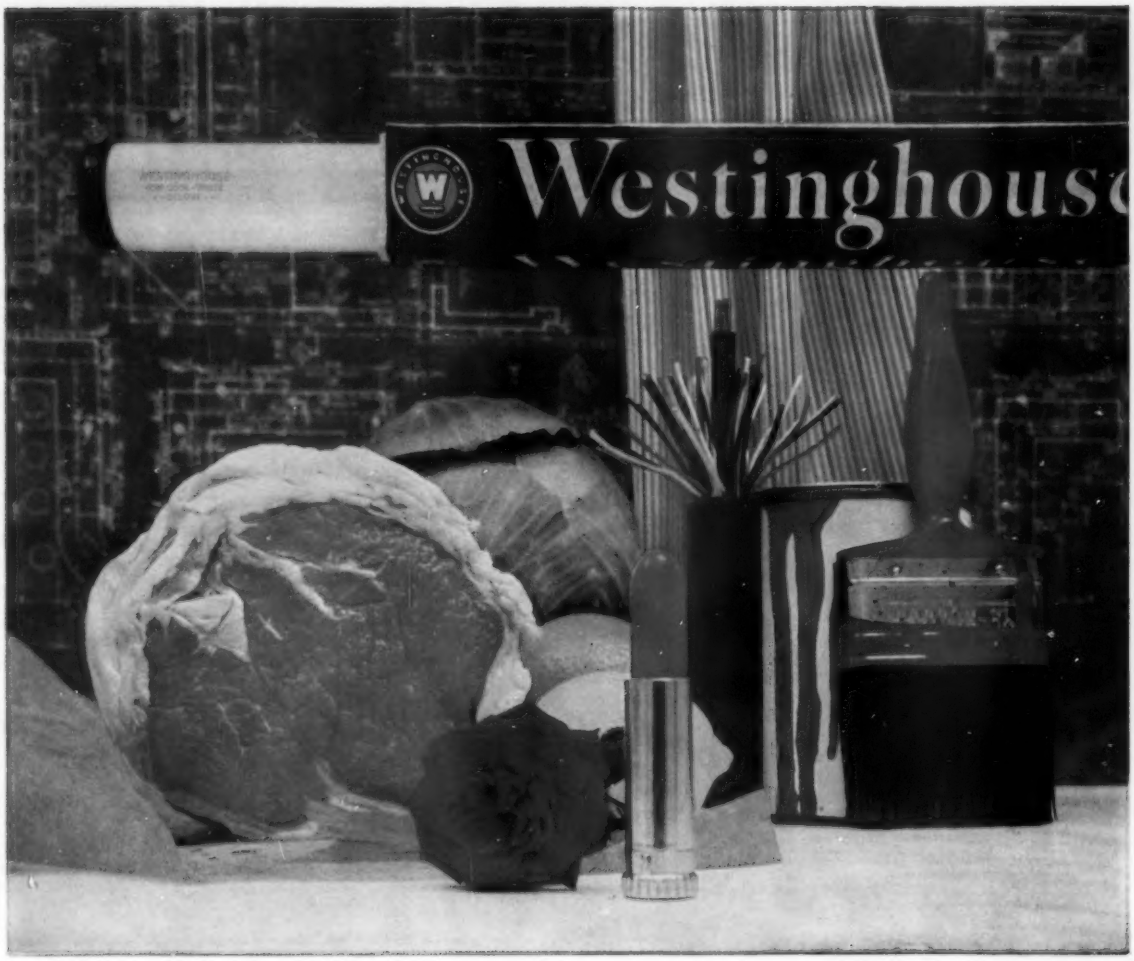
Color-Dynamics for Machines

PLANT ENGINEERING:

"Please send us additional literature on color conditioned machines, as outlined in the article by Walter Kidde & Co., that appeared in the Plant Engineers' Digest section of the April, 1956 issue of your magazine." *George Pellack, Office Manager, G & H. Mechanical Laboratory, Inc., Little Falls, N. J.*

▶ Mr. Pellack's request has been forwarded to Oakley W. Cook, Walter Kidde Public Relations, 260 Madison Ave., New York 16, N. Y. Since the Pittsburgh Plate Glass Co. also had a lot to do with this color-dynamics scheme, we suggested that he also contact John R. Yancey of that company, at 632 Duquesne Way, Pittsburgh 22, Pa.—*Editors.*

how to judge a fluorescent lamp . . . point no. **5**



ask about COLOR RENDITION

If you're like most businessmen today, you know how the proper use of color can speed a lagging production line, work wonders with office morale, give merchandise extra sales appeal. What you may not know, however, is that the color of any surface—be it desk top or cabbage leaf, electrical lead or your secretary's complexion—is largely determined by how that surface is lighted. *And* that light just right for Job A may be all wrong for Job B. Westinghouse fluorescent lamps—available in seven different shades of "white" alone—offer you precisely the proper color of light for jobs from A to Z. "You can be sure if it's Westinghouse."

WATCH WESTINGHOUSE!

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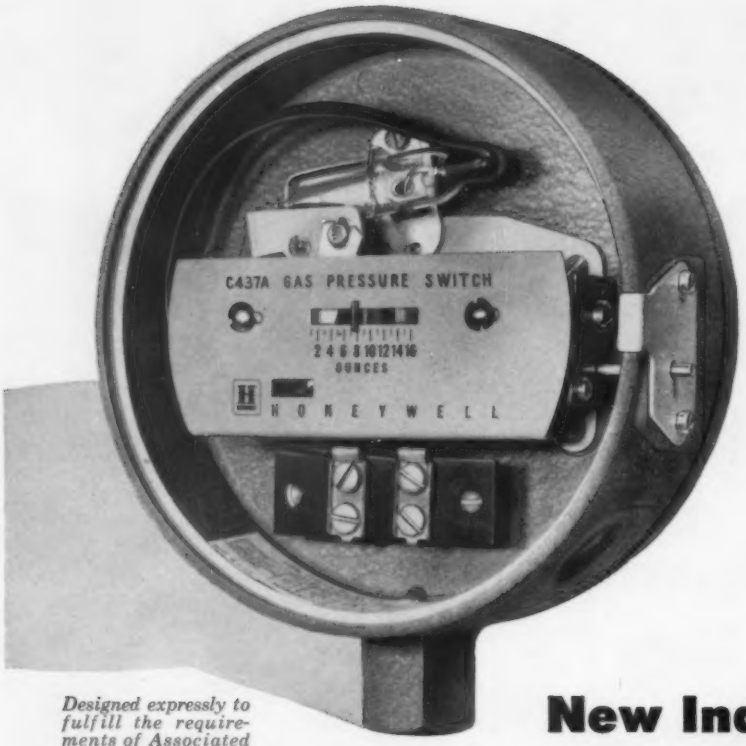

Designed expressly to fulfill the requirements of Associated Factory Mutual and Underwriters' Laboratories.

New Industrial Gas Pressure Switch offers 4 exclusive safety features

USE this new Honeywell C437A Industrial Pressure Switch as a safety cutoff on multiple burner gas installations . . . as a pressure controller for hazardous gases . . . or as a differential controller for air or non-hazardous gases. It's simply designed, yet provides complete protection.

The C437A Industrial Gas Pressure Switch has these exclusive safety features:

1. Sealed Pressure Chamber—Should the diaphragm rupture from over pressure or any other cause, gas can't escape into the switch compartment or to the atmosphere. The pressure chamber is fitted with a pipe tap to permit venting to the stack.

2. Protected Settings—All adjustments are inside the case for protection against careless or accidental manipulation. A metal plate on the side of the case must be removed before changes in adjustment can be made.

3. Ever-Visible Switch Position and Control Settings—The entire cover of the pressure switch is a window. Position of the mercury switch and adjustment of the control settings can be determined at a glance.

4. Lockout Mechanism—An optional safety feature, when manual resetting is desired. The lockout mechanism prevents the switch from remaking contact after pressure has once dropped below the setpoint . . . even though pressure returns to normal. The lockout release button is the only adjustment that can be manipulated without removal of the protecting metal plate.

For complete information, call the nearest Honeywell office. A Honeywell sales engineer is as near as your phone.

MINNEAPOLIS-HONEYWELL REGULATOR CO., *Industrial Division*, Wayne and Windrim Avenues, Philadelphia 44, Pa.—in Canada, Toronto 17, Ontario.

● **REFERENCE DATA:**
Send for Specification S1011-1 Honeywell Gas Pressure Switch C437A

MINNEAPOLIS **Honeywell**
BROWN INSTRUMENTS
First in Controls

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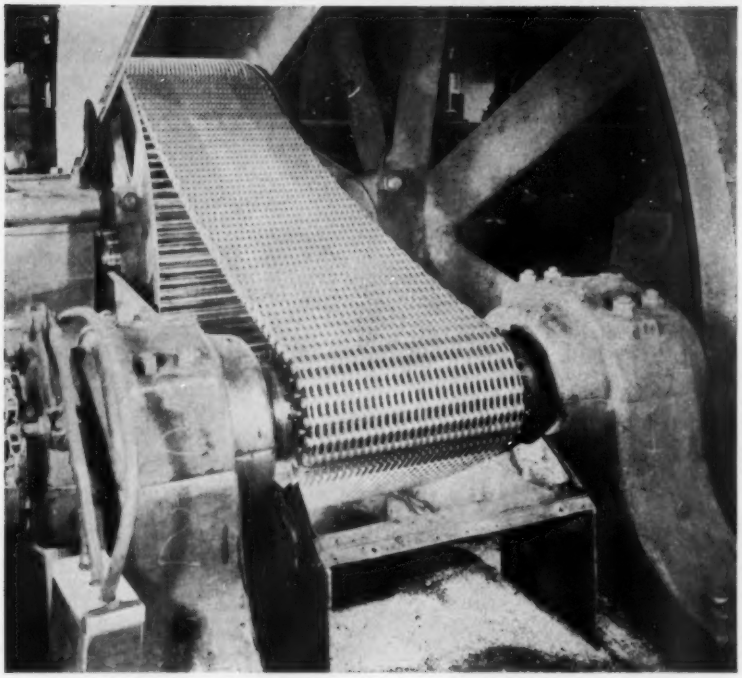
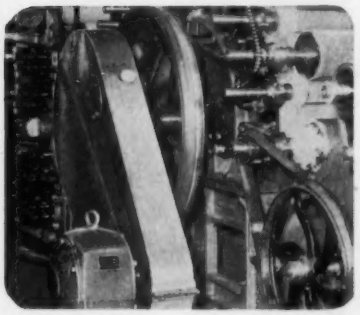
Here's the record of LINK-BELT silent chain

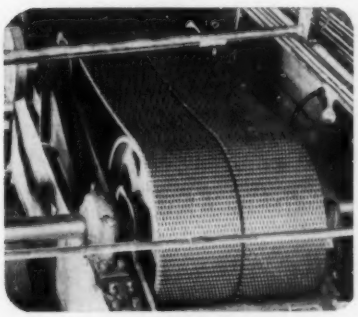


How do your drives compare?

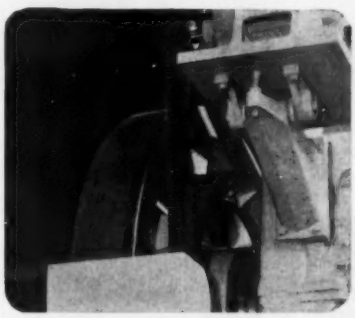


. . . IN SEVERE SERVICE. Link-Belt silent chain driving from a 450-hp motor easily handles the high load requirements of this merchant mill. These drives are often lower in first cost, always lower in ultimate cost — due to minimum maintenance requirements, long life and positive action which eliminates power losses due to slippage.

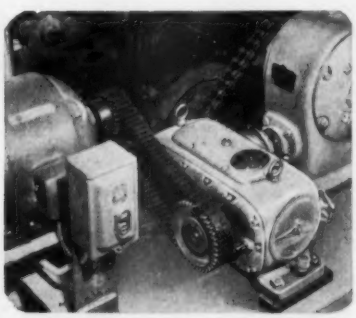
. . . UNDER ADVERSE OPERATING CONDITIONS. Humidity, heat, cold do not lower this chain's better than 98% efficiency.



. . . AT LARGE OR SMALL HP. A versatile line, these drives are available from fractional to thousands of hp.



. . . WITH LARGE RATIOS. Operates efficiently on extremely short centers at ratios as high as 10-to-1.



. . . IN LIMITED SPACE. Easy to assemble in close quarters, silent chain permits built-in drives, compact housings.

. . . AT HIGH SPEEDS. After 13 years on this newspaper press at speeds up to 4700 fpm, silent chain is still efficient.

For more details and advantages . . . for complete selection and technical data — ask your Link-Belt office or authorized stock-carrying distributor for a copy of 88-page Book 2425.

LINK-BELT

SILVERSTREAK SILENT CHAIN DRIVES

LINK-BELT COMPANY: Executive Offices, Prudential Plaza, Chicago 1. To Serve Industry There Are Link-Belt Plants, Sales Offices, Stock Carrying Factory Branch Stores and Distributors in All Principal Cities. Export Office: New York 7; Canada, Scarboro (Toronto 13); Australia, Marrickville, N.S.W.; South Africa, Springs. Representatives Throughout the World. 14.036

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PLANT ENGINEERS' DIGEST so those who rush may read and know what's new

Edited by Marjorie E. Weissman

Poor Plant Layout Is Costly

To AVOID the pitfalls of loose layout planning, it is well to identify and recognize the significance of the four phases of layout planning work. These are: Location of the area to be laid out; general overall layout; detailed layout plan; and installation (including approval).

Failure to plan flexible plant layout results in unnecessary operating expenses plus frequent re-arrangement of equipment. Poor layout planning alone costs industry at least one million dollars per year, while re-layout installation costs and extra operating expenses amount to 10 times that figure.

A good layout costs little, if any, more to install than a poor layout, so it is regrettable if we fail to get built-in economies when we plan and install our layouts. The better the original job, the less will be future expenditures for engineering and installation.

Acceleration of new product development makes long-range planning more important now than ever before, while at the same time, the increase in rate of product and process change calls for greater flexibility in all layouts. *From a paper by Richard Muther, Management Engineer, The Vendo Co., Kansas City, Mo.*

Special Tool and Cartridge Solve Production Problems

NEW CARBIDE tool design and a specially developed tool cartridge were the answer to problems of excessive tool adjustment, erratic performance on a critical operation due to low tool life and "springing" of a thin inside diameter of the work, on an eight-spindle automatic chucking machine, at General Electric Co.'s Commercial and Industrial Air Conditioning plant at Bloomfield, N. J.

Using these devices, production of compressor valve plates rose from almost none to 350 or more per day.

The job involves machining a punched out 1340 annealed steel valve plate on an Acme-Gridley automatic cycled every 50 sec. It entails rough and finish turning the outside diameter; rough and finish forming the inside diameter; facing both sides of the part, and finally, cutting a groove near the inside diameter of the plate.

The groove was the critical part of the job. To produce it required a cut 7/32 in. deep by 0.093 in. wide, leaving a wall thickness of 0.030 in. at the inside diameter of the plate.

Cutting tool protruding from cartridge holder, (arrow) is held in tool block

During the grooving operation either the cutting tool gave out quickly, or it would "spring" the thin inside diameter wall of the valve plate.

Attempts were made to adapt a trepanning tool as well as an opposed-

(Continued on page 42)

Sprayed-on Plastisol Coating Protects Polished Automotive Trim Parts

PLASTISOL film that is sprayed on highly polished chromium and stainless steel parts, is protecting them from damage by scarring and marring.

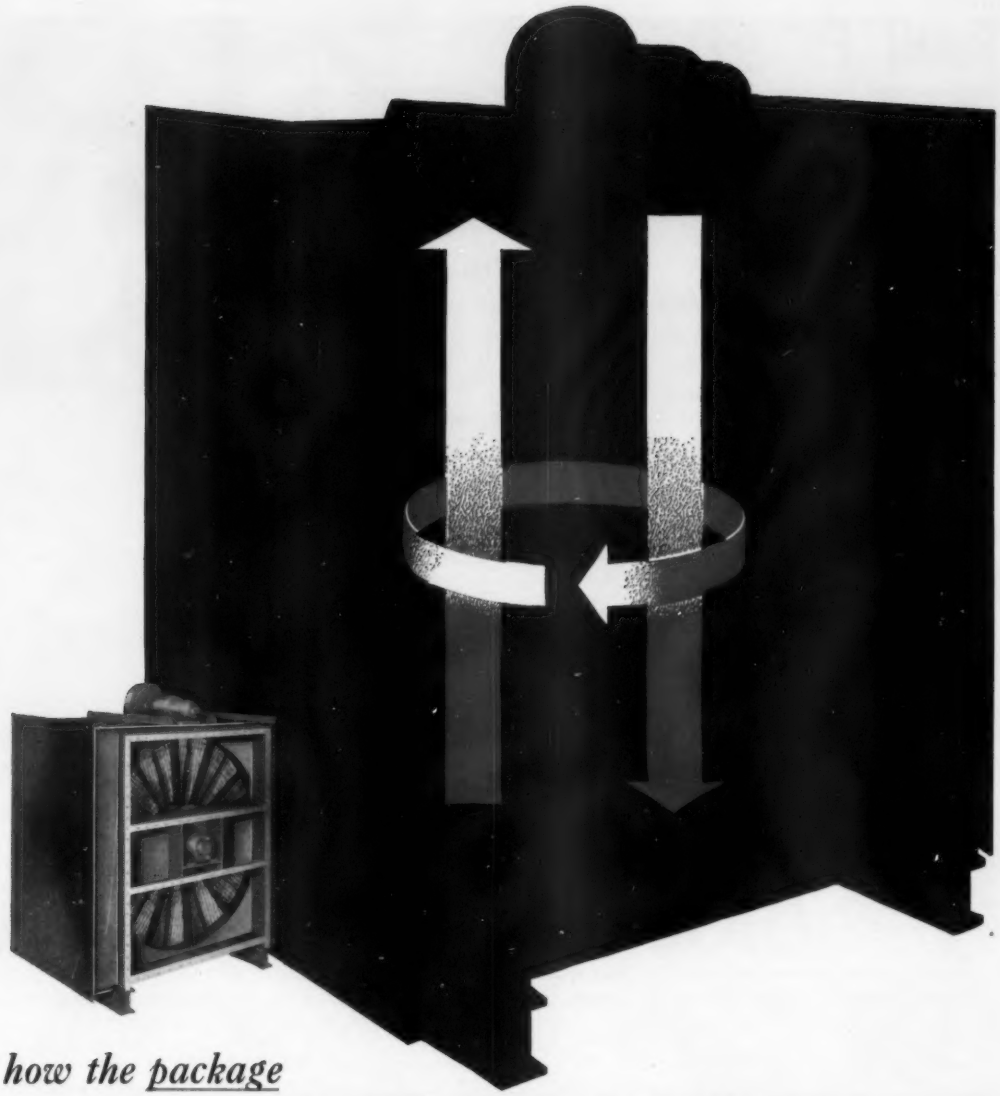
Standard procedure in the automobile industry has been to pack each part separately in paper tubing. Now, a strippable, plastisol coating, based on vinyl resins and compounded by the Dennis Chemical Co., is enabling Buick Motor Div. of General Motors Corp., to increase production rates while saving labor and storage space.

Polished automotive trim moves under spray head to get protective plastisol coat

In the new system, two men spray a coating 1/1000-in. thick on 1500 pieces an hour, compared with 40 pieces packed previously. Parts range from six to 96 in. long and from ⅜ to 12 in. wide. The parts move on a conveyor formed by parallel cables. Specially angled spray nozzles make it possible to spray each part thoroughly. By varying the angle of the spray, all size parts can be coated.

Shallow trays underneath the conveyor system recover excess plastisol. At the end of the conveyor line, banks of infra-red lamps cure the sprayed-on film at 325 F.

The plastisol coatings can be colored or translucent and are easily stripped off the metal parts. They can be applied hot or cold either dip- or flow-coated. *From Bakelite Review, published by Bakelite Co., Div. of Union Carbide and Carbon Corp., New York, N. Y.*



how the package

LJUNGSTROM® AIR PREHEATER

boosts small boiler performance . . .

Advantages of
The Package Ljungstrom Air Preheater

1. Reduces fuel consumption . . . even permits use of low grade fuels.
2. Increases boiler output and reliability.
3. Eliminates cold spots . . . keeps corrosion to a minimum.
4. Easy, fast to clean and maintain.
5. Comes fully assembled—ready to install.

The new, completely *shop-assembled* Package Ljungstrom Air Preheater means that boilers as small as 25,000 pounds of steam per hour can have the advantages of regenerative preheating using the same principle of heat recovery used by large, efficiency-minded utilities.

Here's what the Package Ljungstrom does for you: (1) It saves fuel—roughly 1% for every 45-50 F air preheat. (2) It boosts boiler output and efficiency substantially. (3) Ljungstrom permits use of lower grade fuels. All of which means better performance at lower cost. For more detailed information — get in touch with The Air Preheater Corporation, today. Free brochure on request.

The Air Preheater Corporation 60 East 42nd Street, New York 17, N. Y.

For more facts circle 531 on Reply Card

PLANT ENGINEERS' DIGEST

(Digest begins on page 40)

tool setup to overcome the problem. Both failed.

Use of the carbide tool, combining properties of two grades of carbide, and the cartridge type tool holder, adapted to the machine's main tool slide, overcame the problem.

The cutting tool consists of a Carboloy grade 55A carbide tool shank with special geometries, tipped with Carboloy grade 350 carbide. The carbide tool shank directly under the grade 350 carbide tip is curved and very thin. The tip itself is provided with a 3-deg side clearance and a 2-deg back taper. Width of the grade 350 tip is ground to within 0.093 in. plus or minus 0.001 in.

The cartridge tool holder was designed so that the tool is located from two sides only. When a tool is inserted it is always located in the same position as the tool before it, thus eliminating operator errors. By having several of these blocks available, they are easily preloaded in the tool crib. Since use of a dial indicator is no longer required, loading the tool block of the machine is reduced to about a 3-min job. *From a release of Carboloy Dept. of General Electric Co., Detroit, Mich.*

Electric Blanket Cures Glue

THIN RUBBER blankets that can be bent around corners, stuck into crevices, wrapped around objects or used under pressure, are being used by the Baker Furniture Co. of Holland, Mich., to dry glue in bent plywood layups and to apply veneer strips to table tops, etc.

The blankets are heated by electricity, using a conductive rubber element instead of wires. They can be glued to most surfaces, and nailed or stapled along the edges.

To dry the glue on the layups for the chair backs, the blanket is placed, under pressure, between the plywood and a male mold. The glue is then heat-cured by means of the blanket,

Heat from rubber blankets nailed inside forms in air press heat-cures glue

for 30 min. The complete operation is seven times faster by this method.

Thermostat controlled, the blanket reaches a temperature of 220 F, operating on 115 or 230 v. If punctured, it can be cut across, at the point of puncture, at right angles to the electrical conductors to make two new blankets, or the hole can be cut to a

(Continued on page 44)

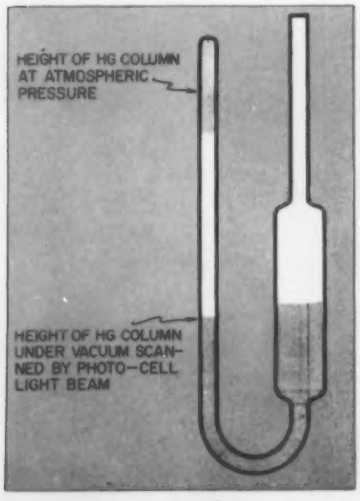
Laboratory-Developed Vacuum Controllers for Drum Dryers

STEAM HEATED vacuum dryers are used in the manufacture of one of our products to evaporate the last traces of moisture from it. Since the process is critical, a series of tests was run over a period of several years to determine optimum conditions of temperature, vacuum, production rates.

With a vacuum differential of 5 in. Hg below barometric pressure, a standard product resulted. In order to maintain this vacuum it was necessary to admit air through a manually controlled valve. This made it difficult to maintain uniform vacuum.

With the assistance of the instrument and electrical departments and the control laboratory, a device was developed which would control vacuum within the limits of our requirements. Under operating conditions it has proved satisfactory over an extended period of time.

To make the device, a pipette was sealed on one end and bent into a U shape. Because it operates as an absolute pressure column rather than barometric, all air must be excluded from the closed end. This was accomplished by heating the mercury to boiling point, driving off entrapped air. The glass tube was then pumped to as good a vacuum as possible, and the heated mercury introduced until the closed end of the pipette contained no voids.



Device is made of laboratory pipette, bent, sealed at one end, then evacuated

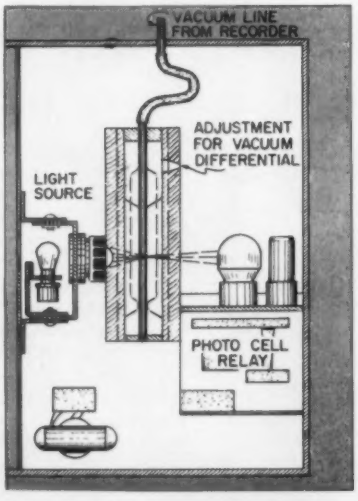


Photo cell relay scans mercury column, actuates solenoid valve to admit air

The original dryer installation included a vacuum recorder. The open end of a pipette was connected into the vacuum line of the recorder. A photo cell relay scans the top of the mercury column in the closed end of the pipette.

An increase in vacuum beyond the instrument setting lowers the mercury column, causing the photo-relay to operate. This opens a solenoid-operated valve which admits air until the desired vacuum is reestablished as set by the mercury column. An accuracy of 0.2 in. Hg is regularly obtained.

The cost of the 10-unit installation amounted to about the price of one commercial unit. *From an article by Fred Brydges and Dean Merica, Engineering department, Post Cereals Div., in GF Technical Bulletin, published by General Foods Corporation, White Plains, N. Y.*

IT'S EASY to reduce annoying and expensive oil leakage like that shown here. The simple act of switching to a Suntac oil – *without making any other changes* – can cut leakage an average of 35%...sometimes 90%!

SUNTAC STOPS SHUTDOWN CAUSED BY OIL LEAKAGE

A manufacturer was having trouble with oil leakage and throw-off from bearings of overhead shafting. This resulted in hazardous conditions and low employee morale. Production had to be shut down frequently. Oil costs were high.

A switch to a Suntac® lubricating oil solved these problems.

If you're losing oil through excessive leakage from rotating or sliding parts, a Suntac oil can cut your consumption an average of 35%. These oils are especially compounded to reduce drip, throw-off, squeeze-out; their greater adhesiveness enables them to cling firmly to the parts...as they lubricate.

Suntac oils can reduce consumption up to 90% when used in hydraulic systems, circulating systems, and in other continuous use applications.

For further information on versatile Suntac oils, see your Sun representative or write SUN OIL COMPANY, Philadelphia 3, Pa., Dept. PY7.

SUNOCO

INDUSTRIAL PRODUCTS DEPARTMENT

SUN OIL COMPANY Philadelphia 3, Pa.

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IN CANADA: SUN OIL COMPANY LIMITED, TORONTO AND MONTREAL

For more facts circle 532 on Reply Card

THIS IS THE STORY of three men and a VALVE. Joe, a chemical engineer, needed valves that could handle tough corrosives. Bill, a refining engineer was looking for valves that gave a positive shut-off. Tom, working for a large industrial firm, needed valves that sealed both upstream and downstream. All three solved their problems by specifying Hamer Visible Wedge Valves. These remarkable valves combine the double sealing action of precision metal-to-metal fit augmented by dependable seal rings. The wedges are trimmed with nickel, while seats are trimmed with stainless steel to withstand the roughest corrosive conditions. The full-view wedges are handwheel operated --can't blow out or drop on a toe. The wedges pivot so no lifting is necessary. So if your plans require long service, sure-seal shut-off valves, by all means specify

HAMER VISIBLE WEDGE VALVES.

P.S. For descriptive literature, write:

Hamer VALVES, INC.
2919 Gardenia Ave., Long Beach 6, California
Representatives Throughout the World.

For more facts circle 533 on Reply Card

PLANT ENGINEERS' DIGEST

(Digest begins on page 40)

clean edge and sealed with insulating mastic. *From a release of United States Rubber, New York, N. Y.*

Shop-Made Press Arm Cradle

When the cradle on a horizontal press arm broke at Simmons Machine Tool Corp., Albany, N. Y., a new part was fabricated in the company's shop.

The first method used was to weld together sections of steel plate to form

New cradle for horizontal press arm was cut from steel plate, welded in shop

the cradle. The electrode chosen for the job was unsatisfactory, and the weld cracked.

Before a second attempt was made, a sample of the steel plate was analyzed and an electrode chosen accordingly. Four rough sections for the cradle were then cut from the steel plate, then joined, two and two, using 3/16-in. electrode. This resulted in deep penetration and a good weld. After the initial passes of the 3/16-in. electrode had been made, ¼-in. electrode was used. When each of the two joined sections were ready to be welded, the method was repeated. Shop fabrication of the part cost much less than replacement of original cradle. *From Welding Arcs, published by General Electric Co., Schenectady, N. Y.*

Inserts Save Castings

Forty cylindrical aluminum castings, 16 in. long and 9 in. OD, were delivered to Franklin Machine Products Co. of Trenton, N. J., incorrectly heated treated by the foundry.

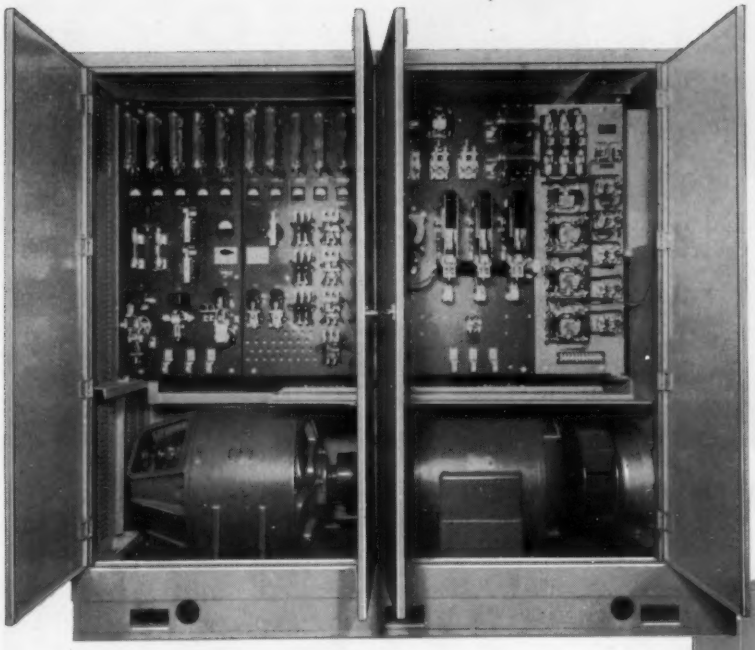
Among the machining operations required on each cylinder were the drill-

PACKAGED

ELLIOTT C-W Adjustable Speed Drives

are your answer for...

- Speed Adjustment
- Positive Stopping
- Reversing
- Dynamic Braking
- Pre-set Speed
- Multi-motor Drive
- Jogging or Creep Speeds
- Automatic Acceleration or Deceleration
- Torque Limit Protection
- Visual Speed Indication
- and many other complex operating conditions



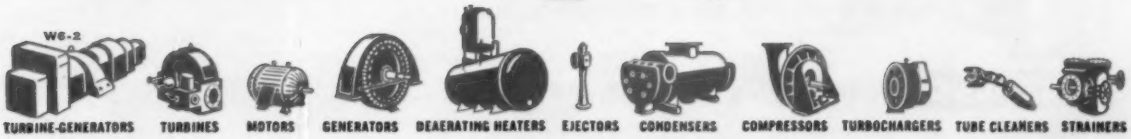
A control cabinet houses the a-c to d-c conversion unit, plus the control required for the particular application. At left is a 100-hp package.

Power unit is housed in a pressurized sheet-metal cabinet with incoming air passing through filters, insuring long life and low maintenance costs. Cabinet has doors, front and rear, for easy access; doors, as well as center posts, are removable.

THESE PRE-ASSEMBLED, PRE-WIRED, easily installed power packages meet today's needs for flexible d-c motor performance from a-c power supply. They are designed for ratings up to 200 hp; speed ranges to 16:1 and up; 208, 220, 440 or 550 volts; 25, 50 or 60 cycles; 2 or 3 phase operation. Many modifications can be provided to meet special operating conditions. All components—power conversion and control—are backed by the Elliott Company's more than half-century experience in the manufacture and application of industrial drives. For complete information, write Elliott Company, Crocker-Wheeler Division, Jeannette, Pa.

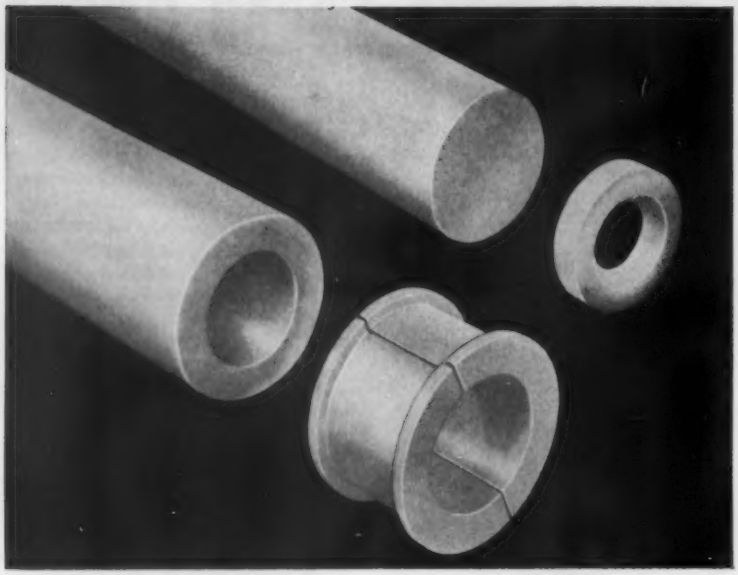
A typical Elliott C-W d-c motor for use with adjustable speed drives. In addition to dripproof (shown) Elliott offers totaliy-enclosed, integral brakemotors and gearmotors.

ELLIOTT Company



For more facts circle 534 on Reply Card

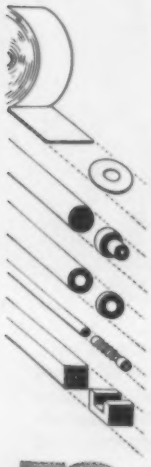
Tough, Low-Cost Maintenance Parts Machined from POLYPENCO® NYLON



High Quality Nylon in Convenient Shapes Gives Maintenance Men Ready Source for Wide Variety of Parts

Above are two Polypenco Nylon Stock Shapes and parts machined from them. Machining was done on standard metalworking tools . . . rapidly, simply, and to close tolerances.

Maintenance men are recognizing the advantages of applying parts made from Polypenco Nylon, such as this valve seat and split bearing. Nylon's resiliency, long-wearing and low friction characteristics are also advantageously employed in bearings, bushings, gears, rollers and other parts.



The use of Polypenco Nylon parts for maintenance applications saves downtime, provides longer wear life, increases production efficiency.

FABRICATE ON STANDARD METALWORKING EQUIPMENT

You can use your own machine tools to turn, tap, thread, mill, etc. in rapid, low-cost machining that assures precision and production under your complete control.

POLYPENCO IS HIGHEST QUALITY NYLON

You get the benefit of all of nylon's desirable qualities in Polypenco Nylon Shapes because it's made under rigid controls with uniform density, dimensional stability and freedom from porosity and stress spots.

Polypenco Nylon is available in principal cities in these shapes for immediate delivery: Rod, Tubular Bar, Tubing, Strip or Slab. For helpful data on machining nylon, write today for technical Bulletin No. 8.

THE POLYMER CORPORATION OF PENNA. • Reading, Penna.
In Canada: Polypenco, Inc., 2052 St. Catherine St. W., Montreal, P.Q.

POLYPENCO Nylon, Teflon*, Q-200.5 and K-51

*DU PONT TRADEMARK

For more facts circle 535 on Reply Card

PLANT ENGINEERS' DIGEST

(Digest begins on page 40)

ing and tapping of twelve ¼-in. by ¼-in. holes at each end. When large steel flanges were bolted to the castings, the threads either stripped or chipped off, making final assembly impossible.

Since the castings represented $2000 in material and labor, it was desirable to avoid scrapping them.

This was done by using round, stainless steel wire inserts made by rolling the wire into a diamond shape, then coiling it into a helix.

These inserts were installed in the castings in three steps. First, the damaged threads were drilled out, then the new threads that were to receive the

Stainless wire thread inserts saved 40 aluminum casts from the scrap heap

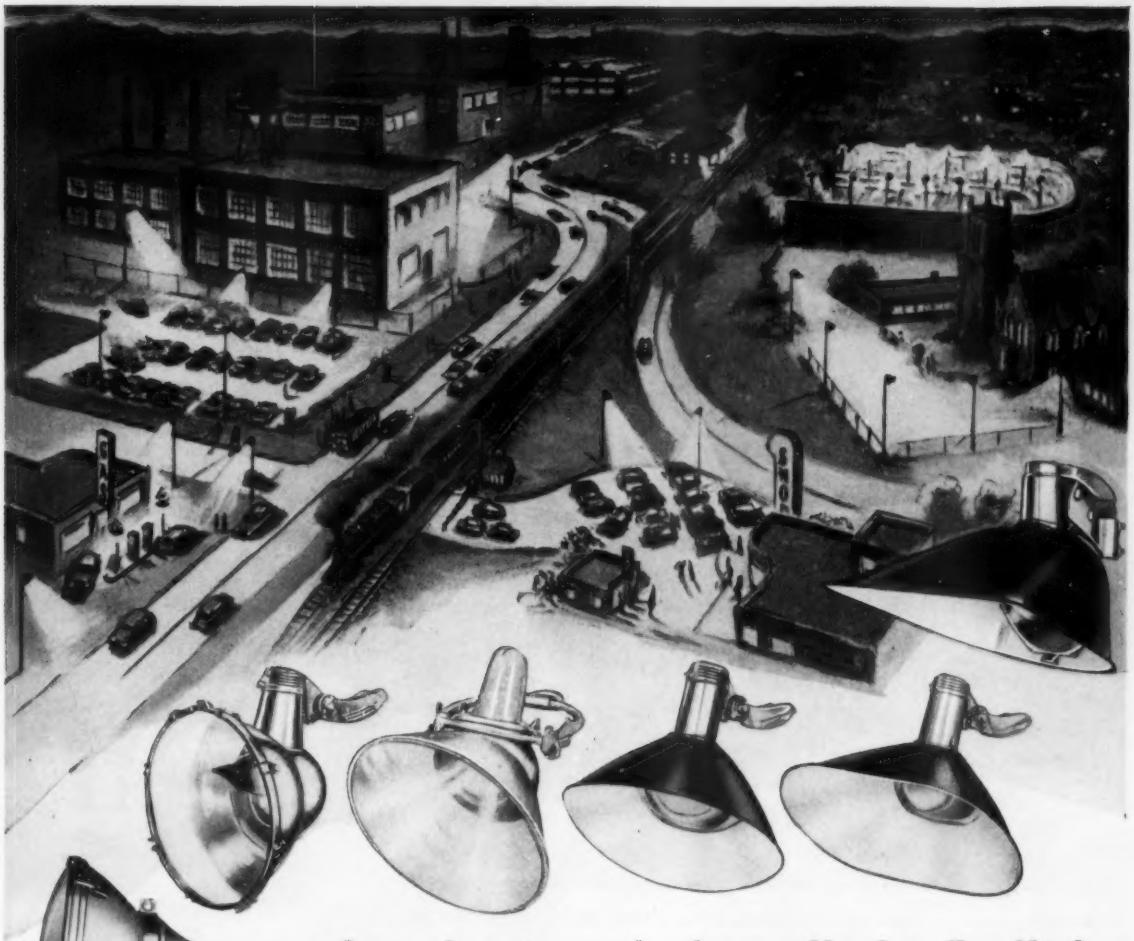
inserts, were tapped. Next, the insert was turned into the threads, providing permanent threads of the original size and series. This operation was repeated on all the holes. *From a release of Heli-Coil Corp., Danbury, Conn.*

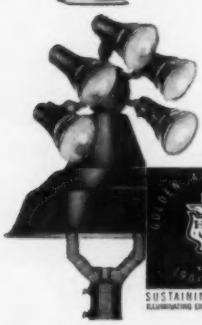
Condenser Defies Corrosion

LARGE VOLUMES of water are used in a barometric condenser at a sugar refinery to condense steam from the pan. Because the refinery is situated on a brackish bay, the salty, highly contaminated water constituted a severe corrosion problem in the condenser and it had to be replaced.

The company experimented with a number of alloys before specifying steel clad with Monel nickel-copper for the new condenser, designed by Henry E. Byer of Hoboken, N. J.

Dispensing with sprays and nozzles, the new condenser delivers water over the two edges of an "impingement bar"





when there's a job that calls for floodlights . . . there's a *BENJAMIN FLOODLIGHT* to do it BETTER!

Whatever your floodlighting requirements, you can rely on Benjamin equipment to do a better job. "*Doing it better*" has been the objective of Benjamin Engineering for over half-a-century. Through the years, Benjamin has pioneered in the use of floodlights in all applications . . . to beautify industrial exteriors . . . to correctly light sports areas . . . to speed up construction . . . to beckon more customers into service stations . . . to facilitate parking for park-and-shop projects, etc. You draw on this vast engineering experience when you specify Benjamin.

That's why you'll find, whatever the floodlighting job, Benjamin Floodlights are time-tested and designed to do it better. They're engineered to deliver sustained performance and original high light output despite continuous exposure to all kinds of weather. Genuine "Life-Time" Porcelain Enamel and "Alzak" Aluminum reflectors simplify upkeep and cleaning of reflecting surfaces. To simplify operation and maintenance, Benjamin Floodlights feature such famous Benjamin engineering refinements as: "Saflox" Floodlight Lowering Devices, patented detachable hood assemblies, convenient pre-setting arrangements and a wider range of brackets and fittings to meet every mounting requirement. Further, every Benjamin Floodlight is specifically designed to meet the requirements of the outside-seeing task with proper shielding, correct light distribution, maximum protection glare and wide range of beam spreads. We will be glad to send you detailed Data Bulletins on any one or all of the floodlights illustrated here. Write Benjamin Electric Mfg. Co., Dept. PE, Des Plaines, Ill.

Here are 8 Benjamin Floodlights that do the job BETTER! *(reading from top to bottom:)*

- "Duo-Service" Floodlight
- "Senior Play-Area" Floodlight
- "Ellipto-Lite Play-Area" Floodlight
- "Olympia" Floodlight
- "Alzo-Lite" Floodlight
- "RD" Floodlighting Projectors
- "Utility" Floodlight
- "Cluster-ettes"

BENJAMIN TRADE MARK
Floodlights

Sold exclusively through electrical distributors. B 3871

For more facts circle 536 on Reply Card

WATER *costs* MONEY

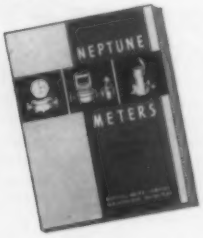
Here's a Simple Way to *Reduce* the Cost

The costs of pumping, purifying, softening and distributing water are something to reckon with. Whether you buy from your local utility or pump your own, your plant water supply probably costs more than it should. Hoses left running, cooling water running down the drain instead of recirculating, neglected leaks, etc., quickly add up to large losses. What's worse, they deplete scarce water resources. Even the cost of sewage disposal depends upon *water* used.

Best way to cut these costs? Put Neptune water meters at every key point. Get water out of overhead and charge it fairly and squarely against each department or process. What stronger incentive to fix faulty equipment and stop careless habits?

Other Neptune meters also available for handling more than 150 industrial liquids. Ask today for full details . . . or a complete plant survey at no obligation.

Send for free technical Bulletin 566 XPE



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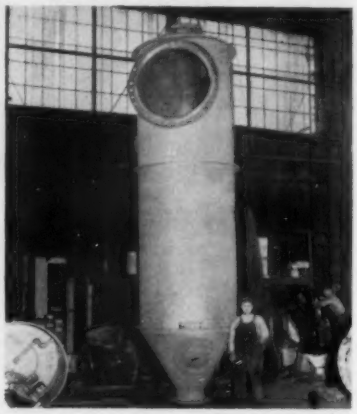
PLANT ENGINEERS' DIGEST

(Digest begins on page 40)



Steel clad with Monel nickel-copper alloy is used for barometric condenser operating with contaminated, salt water

in an unbroken sheet. The absence of small orifices eliminates the possibility of clogging.

The condenser, which handles 3000 gpm, has withstood corrosion from the contaminated water for the seven years it has already been in service. *From Nickel Topics, published by International Nickel Co., Inc., New York, N. Y.*

Maintenance in the Dark

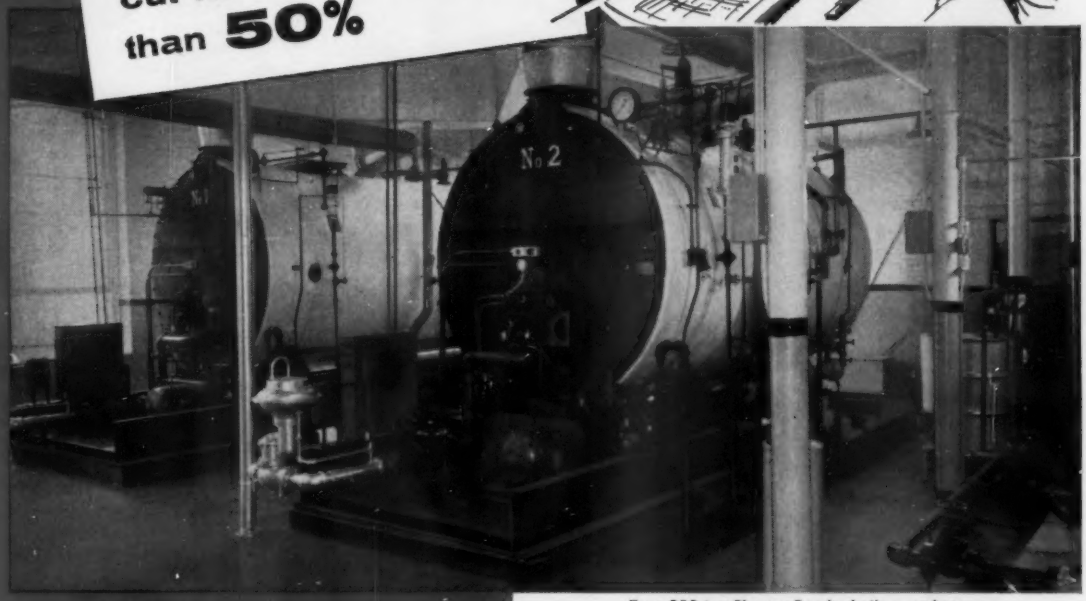
AN ADAPTATION of the World War II electronic, infrared or "black light" searchlight is being used by maintenance men in the Eastman Kodak Co. plant in Rochester, N. Y., to work on equipment in darkened rooms where light-sensitive film is made. The

Maintenance men at Kodak work by light of Snooperscope in darkened area

device, known as the Snooperscope, is about the size of a large flashlight.

Formerly, production had to be halted when the electric lights were turned on while maintenance on film-

Newberry Mills survey showed plant engineers how to cut fuel costs more than 50%



Two 250-hp Cleaver-Brooks boilers replace four obsolete units. "Most attractive boiler room in the South," says Newberry Mills.

Two new Cleaver-Brooks boilers SAVE $23,445 the first year

G. B. Sessions, superintendent of Newberry Mills, says, "Eighteen months ago we installed two new Cleaver-Brooks boilers at Newberry Mills, Newberry, S.C., that are paying for themselves at a fast clip. At the present rate of savings, the boilers will be paid for in less than two years of operation. Fuel costs have been cut more than 50%."

When Newberry Mills engaged consulting engineers to analyze their heat and power load, they learned the startling facts of boiler obsolescence. They learned how they could cut operating costs with efficient boiler equipment. Their experience proves how the new boilers provided fuel and labor savings, a clean boiler room, free of soot, and reduced maintenance costs.

The savings on fuel for the first year of operation were an impressive $14,045.41. Maintenance savings amounted to $9,399.59. Periodic checks showed boilers performed at a fuel-to-steam efficiency of 82.88% on No. 6 oil.

Efficient Cleaver-Brooks four-pass construction with forced draft give you more for your fuel dollar. Four pass design maintains high gas velocity for effective scrubbing action. Forced draft design keeps fans running cool and trouble-free.

PERIODIC SURVEYS PAY. Find out how you can save with Cleaver-Brooks boilers. Get in touch with your local Cleaver-Brooks representative, or write: Cleaver-Brooks Company, Dept. H, 364 E. Keefe Ave., Milwaukee 12, Wis. Cable address: CLEBRO — Milwaukee — all codes.

Send us your name to receive regular issues of new "Cleaver-Brooks Bulletin" — the boiler newspaper!

Cleaver-Brooks®

TWENTY-FIVE YEARS OF LEADERSHIP
BY THE ORIGINATORS OF THE SELF-CONTAINED BOILER

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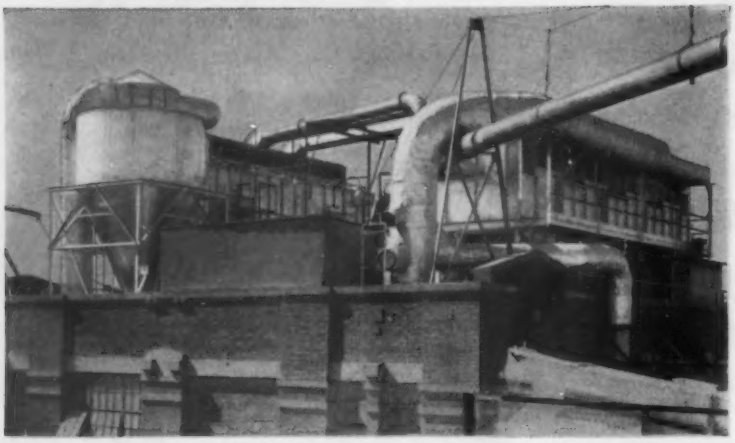
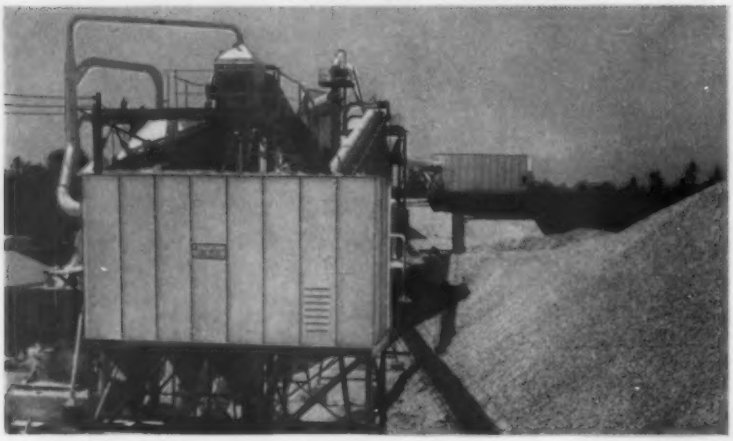
GRAIN...



KELLOGG COMPANY, Battle Creek, Mich., saves $1,400 a *day* with Pangborn Dust Control! That's the value of the 35 tons of cereal "dust" salvaged every 24-hour day. In addition, Pangborn Cloth Screen Collectors keep Kellogg's buildings spotless, reduce machinery maintenance and have made working conditions safe and comfortable for employees.

or GRANITE...



H. E. FLETCHER CO., West Chelmsford, Mass., produces a wide variety of granite products. When Fletcher recently expanded plant operations, the firm installed Pangborn Cloth Screen Dust Collectors on the recommendation of an already-satisfied user of Pangborn Dust Control. Today costs at Fletcher have been cut in three ways; salvaged dust is sold to another firm, machine life is lengthened by reducing dust damage, plant housekeeping is cheaper.

Pangborn CONTROLS DUST

Pangborn can solve *your* dust problem. Pangborn engineers will be glad to show you how Pangborn Dry or Wet Dust Collectors can save you time, trouble and money! See how Pangborn benefits varied industries. Write for free copy of "Out of the Realm of Dust." PANGBORN CORP., 3200 Pangborn Blvd., Hagerstown, Md. *Manufacturers of Dust Control and Blast Cleaning Equipment.*

For more facts circle 539 on Reply Card

PLANT ENGINEERS' DIGEST

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making and processing equipment was carried on.

Light source for the Snooperscope unit is an ordinary electric bulb with a filter which excludes visible light and allows only infra-red rays to pass. These rays are invisible to the eye, but when focused on a special converter tube similar to a television screen, they become visible.

In areas where they are used frequently, the Snooperscopes are permanently mounted; in other areas, portable units, which can be plugged into any convenient power outlet, are used. *From an article published in the Chicago edition of The Wall Street Journal.*

Safety Aloft

A "SKY HOOK" which replaces the C clamp used on safety belts of men working on floating roof tanks at the El Segundo refinery, is the invention of Safety Engineer Jack Neil.

The C clamp held the man secure except for the moment when the clamp

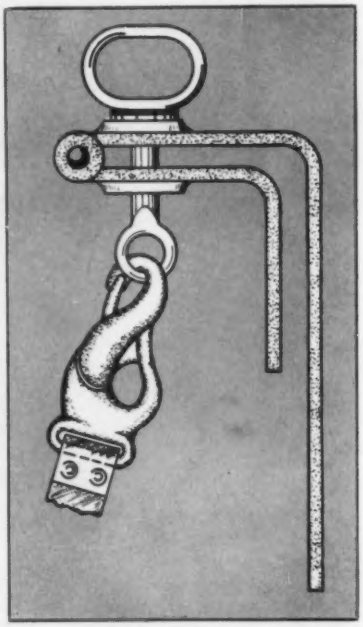
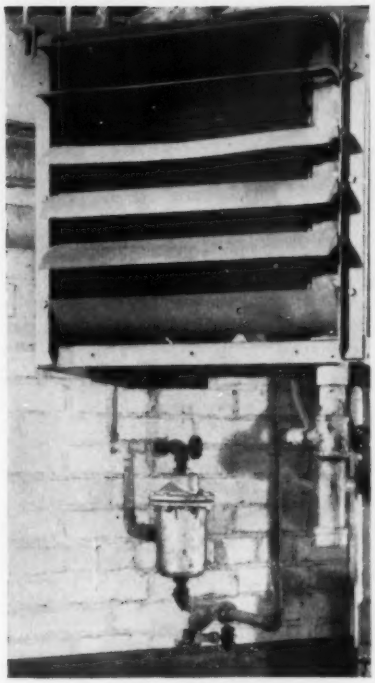


Diagram of "sky hook" which replaces the C clamps on refinery safety belts

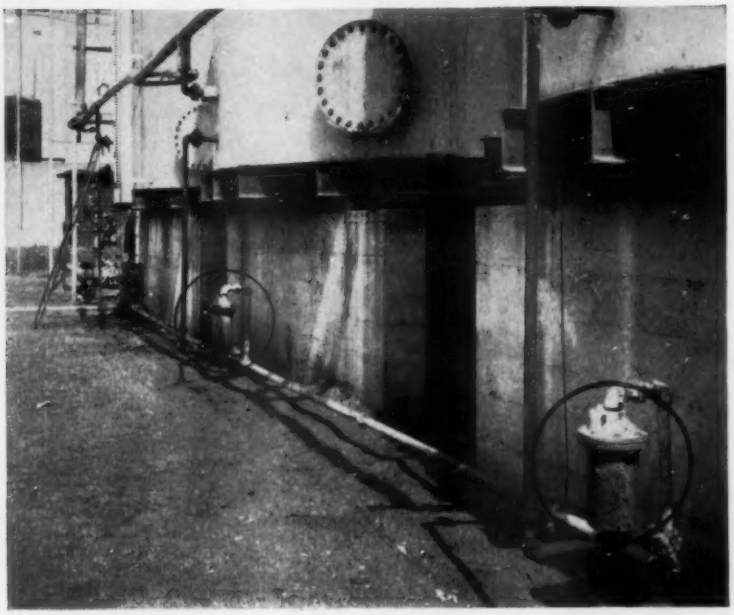
had to be removed; the sky hook which is affixed over the rim of the tank, moves freely with the safety belt attached at all times. *From The Standard Oiler, published by Standard Oil Company of California, San Francisco.*

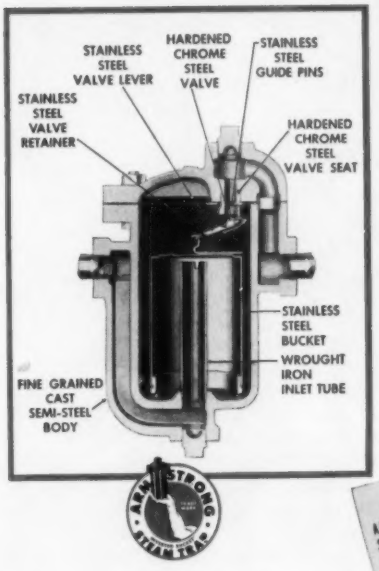
Major Chemical Company Reports Armstrong Traps Cost Less to Maintain



INDOORS—Mr. George Gentes, Works Manager at Hooker Electrochemical Co., Tacoma, Wash., says, "We feel that we get excellent service with Armstrong traps. We have been using them for about 10 years."

OUTDOORS—these Armstrong traps give year 'round service at Hooker's big Tacoma plant.




STAINLESS STEEL VALVE LEVER
HARDENED CHROME STEEL VALVE
STAINLESS STEEL GUIDE PINS
STAINLESS STEEL VALVE RETAINER
HARDENED CHROME STEEL VALVE SEAT
STAINLESS STEEL BUCKET
WROUGHT IRON INLET TUBE
FINE GRAINED CAST SEMI-STEEL BODY
ARMSTRONG STEAM TRAP

Simple, dependable Armstrong traps mechanisms have only two moving parts—bucket and lever. Design, materials and workmanship in low and medium pressure traps identical to that of traps for 900 lbs., 900°F service!

Trap's Lot is a Hard One. A steam trap takes a lot of punishment. On some jobs it may operate *1,000,000 times a year*. The parts are subjected to dirt, scale and corrosive substances, high temperatures and the erosive action of the condensate.

Armstrong's Take it Well. Armstrong traps endure these conditions remarkably well. In reporting on less trap maintenance since installing Armstrong traps Mr. George Gentes, Works Manager of Hooker Electrochemical Company's plant at Tacoma, Washington stated:

"We get excellent service . . . our trap maintenance cost is very low."

Others Agree. More Armstrong customers mention low maintenance than any other single benefit. That means more than low repair costs. It means freedom from leaky traps that waste steam, freedom from faulty traps that slow up production—freedom from *trouble*.

A Suggestion. Send for the Armstrong Catalog listed below or, better yet, call your local Armstrong Representative or Distributor—he's exceptionally well qualified to help you improve your trapping situation.

ARMSTRONG MACHINE WORKS
912 Maple Street • Three Rivers, Michigan

FREE
44-PAGE STEAM TRAP BOOK—Send for yours—no obligation.

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Please send Steam Trap Book to:

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This Hallowell laboratory bench was custom built for a leading chemical manufacturer

This fine bench has a heavy-gage stainless steel top, fitted with chrome fixtures for vacuum, air and electricity. Flush-front drawers with stainless steel pulls glide smoothly on roller bearings. There is ample storage space with sliding doors and adjustable shelves in the enclosed cabinet base. Finish is baked-on charcoal gray enamel over a phosphate undercoat. You can have benches like this one in *your* laboratory or shop—designed and built to meet your specific requirements, and delivered promptly. Write us about your bench problem today. Hallowell Shop Equipment Division, STANDARD PRESSED STEEL CO., Jenkintown 26, Pa.

STANDARD PRESSED STEEL CO.

HALLOWELL SHOP EQUIPMENT DIVISION SPS

JENKINTOWN PENNSYLVANIA

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Rolling Steel Doors

for Craneway Openings and Dividing Walls in School Gymnasiums

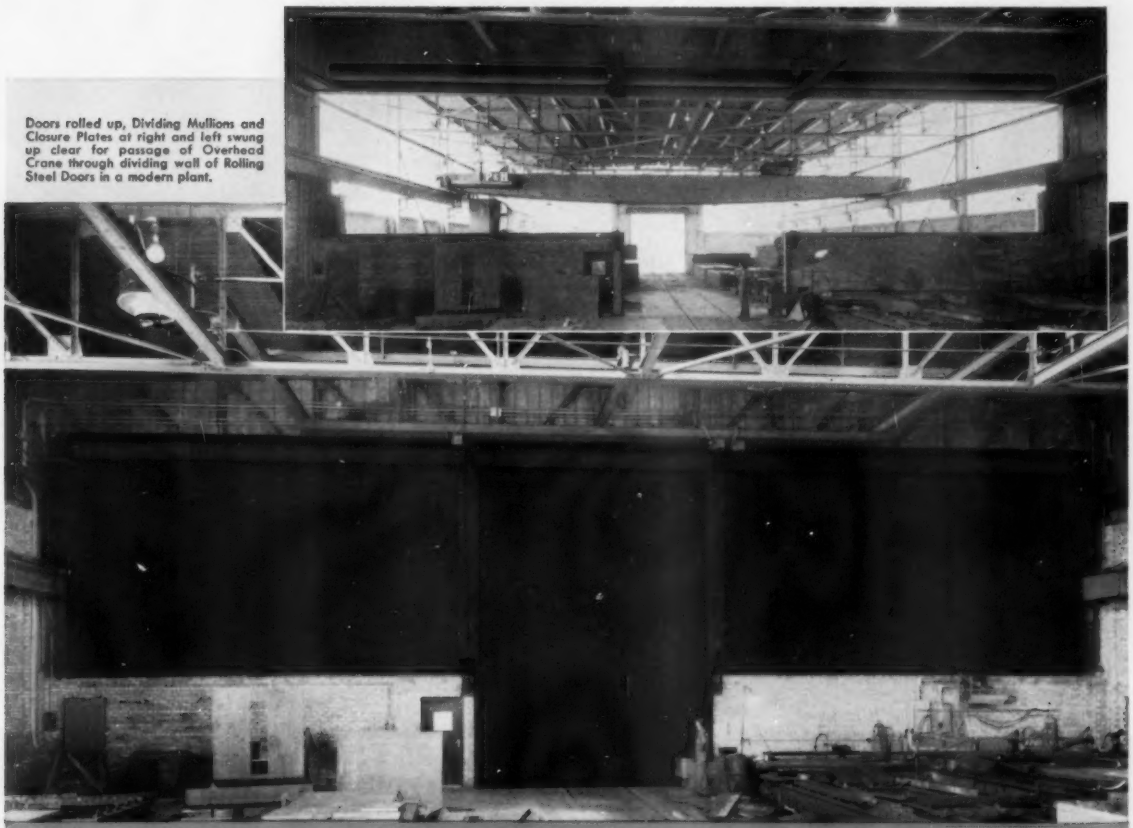
Rolling Steel Doors have proved over many years to be the most practical means of closing overhead craneway openings. This is true regardless of whether the closure be an exterior opening, for an extension of the craneway outside of the building, or a dividing wall inside the building as shown below. In this installation, three separate Mahon power operated rolling steel doors are employed with two swing-up mullions between, and two swing-up closure plates at each end over the crane track-beams—all are power operated and push-button controlled.

The full length door in the center is a railroad opening—the track enters the building through another Mahon power operated rolling steel door at the far end of the building. This center door can be opened independent of the other two for passage of railroad cars. The two rolling steel doors on either side, above the curb wall, are opened only for passage of the overhead crane.

Similar installations have proved most practical in school gymnasiums where it is desirable to divide the gym floor for certain activities. In these installations, aluminum or stainless steel doors are employed with sliding mullions which are moved to either side clear of the gym floor when the dividing wall is rolled up. The operation is accomplished electrically in a matter of minutes.

Mahon experience in this type of installation is extensive. Mahon engineers will cooperate fully in working out details of rolling steel doors for craneway closures or quick-acting, roll-up dividing walls to meet virtually any requirement.

THE R. C. MAHON COMPANY • Detroit 34, Michigan
Sales-Engineering Offices in Detroit, New York and Chicago
Representatives in all Principal Cities



Doors rolled up, Dividing Mullions and Closure Plates at right and left swung up clear for passage of Overhead Crane through dividing wall of Rolling Steel Doors in a modern plant.

ROLLING STEEL DOORS, SHUTTERS AND GRILLES TO MEET EVERY REQUIREMENT

Three Mahon Power Operated Rolling Steel Doors form Dividing Wall which permits passage of a 15-ton Overhead Crane in an 80-foot Craneway in the Verson Allsteel Press Company's new plant, Chicago, Illinois.

M A H O N

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DIAMOND
ROLLER CHAINS

Trade ◇ Mark

Power Drives that don't stretch or slip

The smooth, positive power transfer via Diamond Roller Chains, whether at high speed or low, improves performance, eliminates power waste as well as the cost and time of adjustments.

Uniformity of quality of every part and every foot is one of the outstanding Diamond characteristics that discriminating experienced engineers and production men have counted on for long years of low-cost operation.

Re-examine your power transfer applications now,—and ask the Diamond Chain engineering staff to make practical recommendations.

Catalog 754 has 64 pages of useful information. Copy on request.

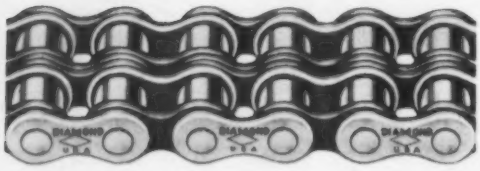
DIAMOND CHAIN COMPANY, Inc.

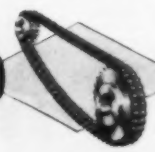
Where High Quality is Traditional

Dept. 614, 402 Kentucky Ave., Indianapolis 7, Indiana

Offices and Distributors in All Principal Cities

Please refer to the classified section of your local telephone directory under the heading CHAINS or CHAINS-ROLLER



DIAMOND  **ROLLER CHAINS**

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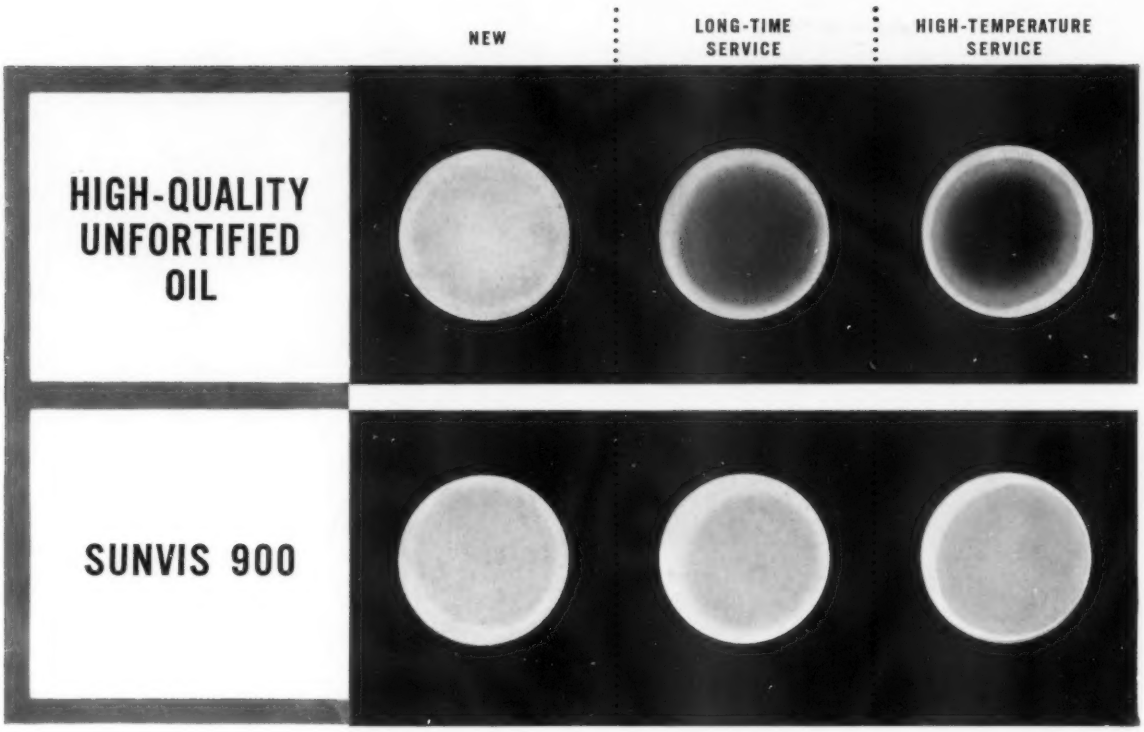


Oil color tests show

WHY SUNVIS 900 OILS SAVE YOU MONEY IN CIRCULATING AND HYDRAULIC SYSTEMS

Color means very little in brand new oils. But...color *change* during service can mean a lot. While minor darkening is seldom serious, radical color changes indicate danger, except, perhaps, in a highly detergent oil.

Either the oil is contaminated by foreign matter, or as in the pictures, the oil has oxidized from heat and long use. The products of oxidation darken the color of ordinary oils...clog valves and filters, cause excessive maintenance.

Compare the appearance of the used Sunvis 900 with the appearance of the other used oil. The color of used Sunvis 900 is practically the same as new Sunvis 900. There is not a sign of oxidation products.

Here's proof that Sunvis 900 oils will last longer and provide the extra needed resistance against the high temperature "hot-spots" of typical hydraulic and circulating systems. *For the long run, a Sunvis 900 oil is the most economical oil you can buy.*

For more information about Sunvis 900 oils, see your Sun representative, or write for Technical Bulletin 35. Address SUN OIL COMPANY, Philadelphia 3, Pa., Dept. I-31.

INDUSTRIAL PRODUCTS DEPARTMENT

SUN OIL COMPANY

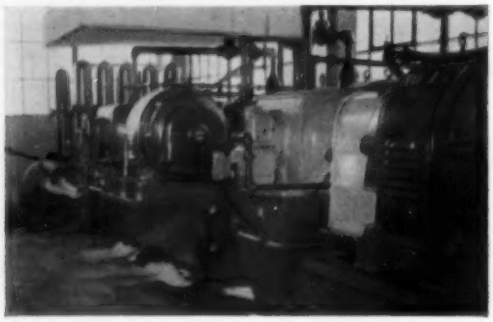
©SUN OIL CO.

Philadelphia 3, Pa.

In Canada: Sun Oil Company Limited, Toronto and Montreal

SUNOCO

High-Pressure Pumps, below, each handle 54 gpm of Sunvis 931 at 2500 psi. Unique closed-loop hydraulic system, left, features color-coded piping.



NEW CENTRAL HYDRAULIC SYSTEM PROTECTED BY SUNVIS 931 OIL

The new variable-pressure hydraulic system at Columbia Records in Bridgeport, Conn., delivers oil at 2500 psi to as many as 40 injection molding machines. Round-the-clock production of micro-groove records depends on the reliability of this system.

Columbia picked Sunvis 931 because their tests and experience have shown it doesn't form carbon or leave harmful deposits...even after years of use. Because of their long life, Sunvis 900 oils are the least expensive oils you can buy for tight circulating systems.

This is just part of the story about Sunvis 900 oils. Why not talk them over with your Sun representative the next time he calls. Or write to SUN OIL COMPANY, Philadelphia 3, Pa., Dept. I-32.

SUNOCO®

INDUSTRIAL PRODUCTS DEPARTMENT

SUN OIL COMPANY

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Nicholson *steam trap* quality *gives you* . . .

extra stamina for severest service

Write, today, for your copy of new Bulletin 10-55—for detailed information.

Nicholson quality . . . throughout . . . means the extra strength, extra capacity, extra stamina that never let down. And, Nicholson quality pays off, when it comes to discharging condensate and air from plant steam lines and equipment . . . most efficiently, dependably, economically.

- **powerful valve action—big husky bellows.**
- **positive shut-off—finely ground valve and seat.**
- **high capacity—effective use of large orifice.**
- **each unit service tested—with steam.**

When less than the best won't do, specify Nicholson.

NICHOLSON

W. H. NICHOLSON and Company

TRAPS • VALVES • FLOATS • METAL PARTITIONS
LAUNDRY, DRY CLEANING AND PRESSING MACHINERY

14 OREGON STREET, WILKES-BARRE, PA. • SALES AND ENGINEERING OFFICES IN 98 PRINCIPAL CITIES

For more facts circle 545 on Reply Card

"My boss agreed . . .

'Let's use Westinghouse maintenance service . . . then we can really concentrate on production!'

"He knew that growing maintenance problems were already cutting into our manufacturing efforts. As plant electrical maintenance engineer, I had been studying the situation for some time.

"We were working old equipment harder than ever, with more shifts per week resulting in less time for maintenance. We simply couldn't afford prolonged down time because production losses mounted too rapidly.

"Production facilities had expanded considerably, but space for maintenance was still limited. We also lacked enough trained personnel and proper equipment. Our ability to handle conditions was inadequate.

"We turned to Westinghouse who with its repair facilities, renewal part stocks and field engineers, was able to solve our problem. We're saving money and the job is being done better than ever. You can probably do the same." J-95172-1

WATCH WESTINGHOUSE!

*WHERE **BIG** THINGS ARE HAPPENING **TODAY!***

You Need Dependable
Round-the-Clock
Maintenance Service
To Maintain Production

- Motors
- Generators
- Exciters
- Welders
- Transformers
- Control and Switchgear
- Lifting Magnets
- Circuit Protective Equipment

Here's our answer to this problem

"When we called in Westinghouse . . .

"We learned new ways to prolong equipment life, lower maintenance costs

"We cut capital investment and reduced operating expense by letting Westinghouse service our electric equipment. It all started when the Westinghouse representative appeared and made his presentation, 'The Economies of Electrical Apparatus Repair.'

"He showed that Westinghouse had the men, materials and methods to do a superior job for us three ways: repair plants, engineering and field service and renewal parts.

"We liked the proposal and gave Westinghouse a larger share of our maintenance and repair work. Besides sound engineering consultation, we get round-the-clock service and a one-year guarantee. Equipment life has been prolonged, maintenance costs are lower and down time is reduced. Here's why.

"*We broadened our repair facilities* without investment or upkeep when we began to use some of the 38 well-equipped Westinghouse repair plants.

WATCH WESTINGHOUSE

"Westinghouse uses specialized and standardized repair methods with quality control checks that assure maximum performance from every repair job. Newly developed techniques are applied immediately to all repair jobs by skilled Westinghouse craftsmen.

"We benefit by new Westinghouse developments in design and modernization because Westinghouse repairs are backed by its entire manufacturing and engineering resources, including research. For example, Westinghouse has engineered individual rewinding processes like Bondite, Coilife, Thermalastic® and silicone to meet operational demands on electric equipment in any industry.

"*Westinghouse engineering and field service* tests, inspects and repairs our large apparatus that can't be moved readily.

"These skilled specialists eliminate trouble before it starts through preventive maintenance. This prevents critical shutdowns and reduces big repair bills . . . makes valuable equipment last longer. This service helps our own staff by furnishing exacting tests that are possible only with special equipment.

"Westinghouse field engineers redesign and rebuild old equipment to meet up-to-date needs. As in Westinghouse repair plants, they use the latest methods and processes for thorough, longer lasting repairs.

"*More value for our parts dollar* . . . that's our experience with genuine Westinghouse renewal parts. They're precision-built to fit right . . . save hours on repair jobs. We get original equipment performance, or better . . . because of advanced designs, proper methods and materials, thorough tests and inspection.

"Constant improvements through research go into Westinghouse parts and materials. Result is exclusive features, plus top performance, economy and convenience. For example, coils insulated with Bondite, Thermalastic and silicone will upgrade, and in some cases, actually up-rate old equipment.

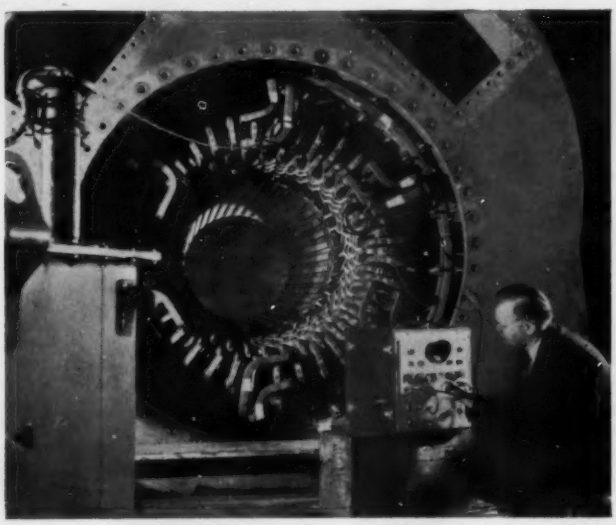
"Thirty-four strategically located Westinghouse renewal parts warehouses with back-up stock at numerous manufacturing plants help us reduce our parts inventories as much as 50%.

"Why not call Westinghouse, like I did? Its personnel will gladly work with your staff to improve maintenance and boost your productivity."

Call your local Westinghouse sales representative for a presentation of, "The Economies of Electrical Apparatus Repair", and a personally guided tour through a local Westinghouse repair plant. Or write, Westinghouse Electric Corporation, 3 Gateway Center, P. O. Box 868, Pittsburgh 30, Pennsylvania.

J-95172-2

Slot discharge test detects capacitive discharge which can destroy coil-ground insulation. Slot discharge analyzer is an exclusive Westinghouse development.



Fast, efficient Westinghouse ordering system and parts warehouse in your area help you keep on hand only those parts most frequently required.

*WHERE **BIG** THINGS ARE HAPPENING **TODAY!***

For more facts circle 546 on Reply Card

OPERATION AND PRODUCTION pointers for the industrial plant engineer

Edited by H. E. B. Anderson

Transfer Pipe Kept on the Griddle

REFILLING the molten-lead chamber of hydraulic presses is a problem at the Okonite Co., which uses the presses to extrude a casing of lead around heavy-duty paper-insulated electrical cable. The high operating temperature of the equipment makes it impractical to feed lead continuously to the chamber, so the presses must be recharged at 30-minute intervals with 900 lb of molten lead from a storage tank. This refilling is done by gravity flow, through an L-shaped length of three-inch stainless steel pipe.

This transfer pipe must be kept hot, to prevent sudden contact with the 600 F lead producing substantial thermal shock in the transfer pipe. Formerly kept hot by cradling it over an L-shaped gas burner, which offered no accurate temperature control, the pipe frequently became excessively hot. This overheating tended to oxidize some of the molten lead as it passed through the pipe and the oxidized lead accumulated inside the pipe.

Operator stands inside "L" of oven to handle the hot transfer pipe safely

To eliminate these difficulties, Okonite devised an oven, L-shaped to fit the pipe and hinged along its longitudinal axis, to maintain the pipe at 300 F between uses. Heat is supplied by the three tubular heaters in series, totalling 2750 watts, spaced uniformly inside the bottom section of the oven. The heaters are controlled by a bulb-and-capillary indicating controller, made by Fenwal Inc., Ashland, Mass.

Mounting of the controller and 220-v, 3-phase contactor on a panel attached to the oven frame facilitates moving oven and controls as a unit. The sensing bulb of the controller is positioned in the lower section of the oven, just under the surface which supports the transfer pipe.

The oven is fabricated from sheet steel and mounted on angle-iron legs.

Piping Gets Taped for Protection

A PROTECTIVE plastic coating, consisting of spirally wrapped glass-cloth tape bonded with epoxy resin, has

(Continued on page 64)

Epoxy Resin, Glass Cloth Team Up to Make Patches in Metal Tanks, Pipes

Fig. 1. Area around "test" hole is cleaned to bare metal to receive prime

Fig. 3. Second layer of glass applied. Multiple layers stand high pressures

MAKING REPAIRS to metal tanks, pipes and conduit without welding has been simplified by a new method developed by the Smooth-On Manufacturing Co., Jersey City, N. J. Patches have been tested for extended periods at pressures over 1000 psi, without failure. Corroded or broken out areas, split seams, breaks and porous areas can be effectively repaired in tanks, pipes, or conduit handling fuel and lube oils, gasoline, acids, alkalis, or most any liquid, gas or powdered material, according to the manufacturers.

The resin used, called Sonite, has good adhesion to metals, will withstand temperatures to 200 F, and is available in white or aluminum pigmented form.

The accompanying photographs illustrate the method of patching a hole in a tank. All the needed materials are supplied in a repair kit including glass cloth, stirring paddles, brush and brush cleaner, and Sonite compound.

Cutting each successive patch slightly larger than the last will provide for feathering the edges. The completed patch can be filed or sanded smooth. At room temperatures, the patch will harden sufficiently to permit use in 18 hours. External heat must be applied if the hardening is to take place in cold weather, or if a faster cure is desired to restore equipment to use.

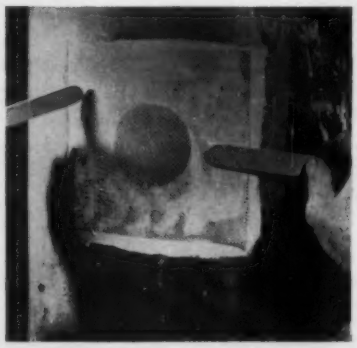


Fig. 2. Patch of glass cloth is pressed into prime coat, then coated with Sonite

Fig. 4. Final Sonite coat is applied. After curing, patch is ready for service

For more facts circle 547 on Reply Card ⟶

Wissco Belts carry Libbey glassware through annealing lehr. The glassware—and the belts—are subjected to elevated temperatures for approximately an hour. This is another example of how...

FAMOUS NAMES

ride on WISSCO BELTS

Libbey Glass Division of Owens-Illinois

Libbey is a name that's well known for glassware of top quality. For its annealing operation, which helps insure this quality, Libbey purchased four Wissco Belts of thin, flat construction with improved lehr edge. High heat is applied at the beginning of the operation, and then gradually diminished. The glassware emerges at the cool end of the lehr with stresses and strains equalized. Wissco Alloy Processing Belts are the choice of many famous names in industry—leaders in their fields. You, too, will find Wissco the most economical and efficient belt for every processing operation—for metals, ceramics, glass annealing and decorating.

For details, *write or call our nearest office:*

THE COLORADO FUEL AND IRON CORPORATION
Denver and Oakland

WICKWIRE SPENCER STEEL DIVISION
Atlanta • Boston • Buffalo • Chicago • Detroit • New Orleans
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WISSCO BELTS
PRODUCT OF WICKWIRE SPENCER STEEL DIVISION
THE COLORADO FUEL AND IRON CORPORATION

CF&I

2769

OPERATION — PRODUCTION

(O and P begins on page 62)

Pipe and fittings of Duriron, reinforced with glass cloth tape and epoxy resin

been developed for use on acid-carrying pipe lines by Carbide and Carbon Chemicals Co., in cooperation with Bakelite Co., both divisions of Union Carbide and Carbon Corp.

The new coating was developed for use on Duriron pipe at the South Charleston, W. Va. plant of Carbide and Carbon Chemical. The coating serves as a mechanical reinforcement as well as a preventive to chemical attack for the pipe, which is formed of high silicon content Duriron. It is used on a 100-ft long transfer line carrying alcohol and strong sulfuric acid at 70 C to 100 C, through four-inch pipe at low pressure. If the contents of this pipe were to escape, they would present a serious fire and personnel hazard.

To apply the coating, the surfaces of the pipe are first cleaned by sandblasting, then covered with a brush coat of epoxy resin. When this coat has dried to a tacky state, a three-inch-wide tape of glass cloth is wrapped around the pipe. Several layers are used, to prevent unwrapping during the application of a second coat of the epoxy resin which is brushed well into the fabric and allowed to dry until hard. It is then cured in an oven at 90 C for four to six hours.

Automatic Mold Sand Preparation

IN PREPARATION of mold sands at the Granite City plant of General Steel Castings Corp., unassisted instrumentation maintains continuous automatic repetition of two-minute cycles. During each cycle, predetermined weights of two or three different types of mold sand and binder are delivered by conveyor belt to a skip bucket; the skip bucket is elevated, dumped into a sand muller, and returned to the weighing scale; and the muller is automatically timed through a sequence of operations and emptied. Simultaneous operation of the muller and sand proportioning equipment speeds up production of mold sand.

The recent addition of a batch timer to the six existing systems for automatically proportioning mold sands by weight gives complete automation characteristics to the preparation of the sand. Automatic weighing and handling is facilitated by Baldwin-Lima-Hamilton SR-4 load cells. Three of these cells, 2000-lb capacity each, are the weight sensitive elements of electric scales for each of the six skip buckets, with cycling of sand feeders under the control of a strip chart recorder-controller.

Vibrational feeders under sand storage bins are operated in series by the controller-recorder when a switch is operated by the skip bucket on return to its filling position. Sand "A" is fed onto the belt until a skip bucket weight signal from the load cells to the controller stops the feeder. The feeder for sand "B" is then started and it delivers sand until the bucket weight reaches a value that causes the controller to break the electric power circuit to its feeder motor. If a third sand is required, this procedure is repeated for sand "C." The amounts of each sand fed to the conveyor belt are regulated by three control dials on the

(Continued on page 66)

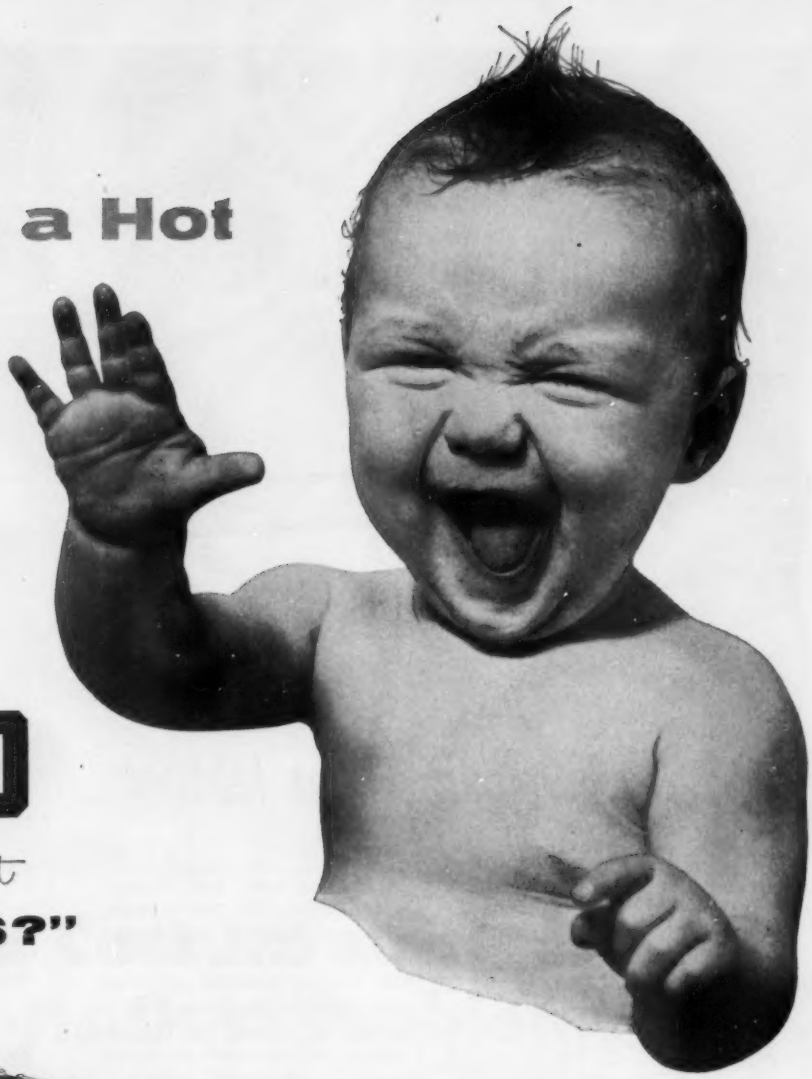
Guide for Using Carbide-Tipped Masonry Drills Tells Speeds, Pressures

Recommendations by Carboloy engineers of drill speeds and pressures best suited for drilling in several types of materials

Table: Carboloy Department, General Electric Co.

Drill Diameter	3/16		1/4		5/16		3/8		7/16		1/2		9/16		5/8		11/16		3/4		7/8		1		1-1/8 & 1-1/4		1-1/2	
Electric Drill Size	1/4		1/4-3/8		1/4-3/8		3/8-1/2		1/2-5/8		1/2-5/8		1/2-5/8		1/2-5/8		1/2-5/8		5/8-3/4		5/8-3/4		3/4		3/4		3/4	
Speed; Thrust	S	T	S	T	S	T	S	T	S	T	S	T	S	T	S	T	S	T	S	T	S	T	S	T	S	T	S	T
Hard Concrete with: Small Quartz Agg. Granite Agg. Trap Rock Agg. Bluestone Agg.	1000 to 1250	55	900 to 1000	70	800 to 900	75	750 to 825	80	650 to 700	95	600 to 650	120	550 to 625	125	525 to 600	140	525 to 550	150	500 to 550	155	475 to 525	170	450 to 500	175	425 to 475	180	400 to 450	240
Glazed Vitreous Tile Terra Cotta Structural Tile Rock Bluestone Sandstone Hardmarble		40		45		65		75		85		100		115	125		125	140		120		150		145		155		200
Brick with: Slag Center Hard Burnt		25	1000 to 1200	25		45		60		90		95		100	100		110	100		110		110		125		140		150
Concrete with: Small Hard Agg. Limestone Agg. Cinder Agg. Terrazzo Soft Marble Cinder Block Cement Block Common Brick Soft Limestone	1275 to 1325	15		25		30		40		60		75		85	90		100	110		120		130		140		150		160
																												175

"Here's a Hot ONE!

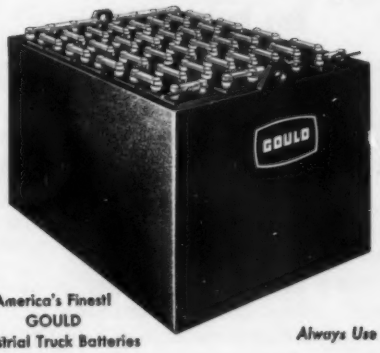


Ever hear the one about the guy that didn't use

GOULD

Research-built

BATTERIES?"



America's Finest!
GOULD
Industrial Truck Batteries

It's no joke when you pick the wrong battery. The lucky fellows are those that have standardized on GOULD. They not only have the satisfaction of knowing they've got advance-design, research-built batteries that will do more and last longer . . . they have the finest field engineering service in the industry to help keep these batteries in top condition throughout their greatly extended service life. Every Gould battery is proven in Gould's own pilot plant before it ever goes into production. That's why you can be sure of getting more power per dollar—with Gould!

Always Use Gould-National Automobile and Truck Batteries

GOULD
BATTERIES
GOULD-NATIONAL BATTERIES, INC.
Trenton 7, N. J.

"BETTER BATTERIES THROUGH RESEARCH"

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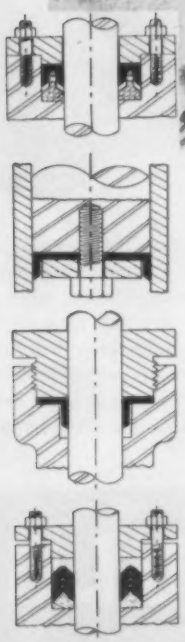
for honing and polishing

. . . you can't beat leather



. . and you can't beat Tannate Leather Packings for their inherent tendency to hone or "lap" in the metal parts upon which they work. Other packing materials operating under the same conditions have a tendency to score, yet Tannate Packings will not score or abrade the most highly finished surfaces.

Tannate Packings are precision molded and accurately finished for a most effective leak-proof seal. Tannate packings are job engineered from start to finish to meet your exact requirements.

If you design or maintain cylinders or presses send for Rhoads new Packing Hand Book now. Write J. E. RHOADS & SONS, 2100 W. 11th St., Wilmington 99, Del.

RHOADS

INDUSTRIAL LEATHERS

Wilmington New York Chicago Atlanta

For more facts circle 549 on Reply Card

OPERATION—PRODUCTION

(O and P begins on page 62)

panel board which can be set in 20-lb increments to 3000 lb.

The bonding material vibrator is also started by the returning bucket when it closes a switch. When enough material has been vibrated, the hopper tips and discharges its material onto the belt. The tipping operation opens a limit switch and stops the vibrator.

The muller is operated through a two-minute cycle by six consecutive timers. Water is first introduced into the mill and then weighed sand ingredients are lifted and emptied. The sand, binder and water are mulled for a predetermined time to develop the sand characteristics required, and the prepared sand is discharged out of the mill onto belt conveyors for distribution to various molding centers. After the mill is empty the controller resets itself and repeats the two-minute operation cycle.

There are several interlocks in the system to assure proper operation. For example, the skip bucket can be lifted only if the SR-4 load cells give an indication that the full weight of sand is in the bucket.

Use of the method has improved the consistency of the mold sand physical properties, and weight accuracy has been within 1 per cent for batches up to 2000 lb regardless of moisture content, height of sand in the bin or cleanliness of the conveyor.

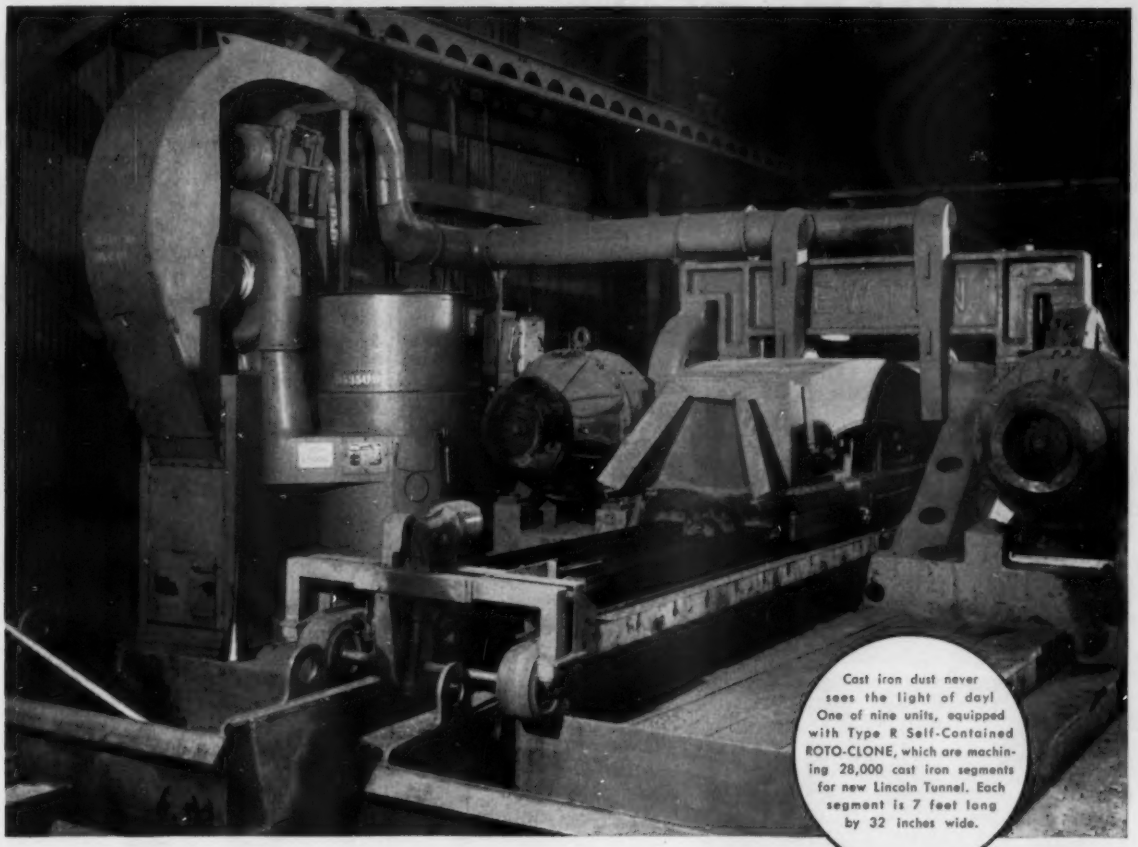
Cable Reels Team Up, Hold Pushbutton Station

IN A STEEL WAREHOUSE, where lack of definite aisles and other general floor conditions required the operator of the overhead crane to stay away from the load when in motion, safe movement of heavy-duty angle iron by the crane was a time consuming operation.

Since cost considerations ruled out the purchase of a new cab crane, engineers of the Wright Hoist Div., American Chain & Cable Co., Inc., who manufactured the existing 5-ton crane, suggested remote control for the crane.

A unique design, suspending the push button station control from the outrigger channel, independent of the trolley, uses two cable reels, one at each side of the crane.

In addition, a 4-in. I-beam was mounted under the outrigger, along which a small trolley carries the pushbutton station cord. A reversed catenary curve built into the I-beam will



Cast iron dust never sees the light of day! One of nine units, equipped with Type R Self-Contained ROTO-CLONE, which are machining 28,000 cast iron segments for new Lincoln Tunnel. Each segment is 7 feet long by 32 inches wide.

Even a Cast Iron Highway Has Its Dust Problems

LINCOLN TUNNEL'S third and newest traffic tube under the Hudson River will literally be a cast iron highway — a mile-long highway formed by placing 2000 giant cast iron rings side by side. Each ring, measuring 31′ in diameter by 32″ wide, consists of fourteen 7′ long segments which are assembled at the job site.

2000 × 14 = 28,000 segments that must be carefully machined to insure precision assembly. But AAF had a ready-made solution to this "king-size" dust problem — the Model R Self-Contained ROTO-CLONE.

Now, cast iron dust is always "under wraps". Through integrated control, the Model R successively removes (1) the chips in a precleaner, (2) then the coarser dust particles with a Type D ROTO-CLONE, and (3) finally the fine float cast iron and graphite with a Cycoil Oil Bath Scrubber. Final result—this air, when returned to the work room, is cleaner than that of the surrounding area.

AAF's 23 years of dust control experience penetrates every industry—covers thousands of successful applications. Call your local AAF representative now.

Air Filters and Precipitators

Illinois Steam Heating Specialties

AAF Herman Nelson

American Air Filter COMPANY, INC.

228 Central Avenue, Louisville 8, Kentucky
American Air Filter of Canada, Ltd., Montreal, P. Q.

— BETTER AIR IS OUR BUSINESS —

Herman Nelson Unit Heaters

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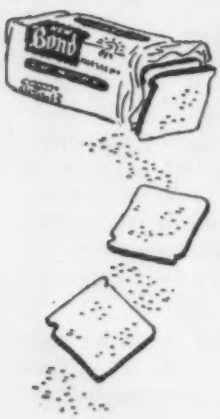
BAKING PLANT RECEIVES 29 YEARS OF TROUBLE-FREE GAUGING



Reliability is a *must* in industrial gauging. That is one reason why Liquidometer quality gauges are specified in a wide range of industries where liquids are stored and measured.

The Liquidometer gauge installation at General Baking Company's Brooklyn plant is typical. It takes close to 7000 gallons of fuel oil per week to run the baking ovens, generate steam and heat the plant. Here, the important job of fuel gauging has been successfully performed by the same Liquidometer Senior gauge uninterruptedly for 29 years.

Dependability, low-maintenance, high readability, safety and ease of installation suit Liquidometers for your liquid gauging needs.

A variety of dial type Liquidometer gauges are available for direct and remote indication. For complete details write Dept. D for Bulletin 463.

LIQUIDOMETER INSTRUMENTS

Liquids worth storing are worth measuring

THE LIQUIDOMETER CORP.

SKILLMAN AVENUE AT 36TH STREET, LONG ISLAND CITY 1, N.Y.

For more facts circle 551 on Reply Card

OPERATION—PRODUCTION

(O and P begins on page 62)

compensate for the pull of the cable reels, therefore allowing the pushbutton station to remain where the operator leaves it, rather than move to the center of the span if left unattended along the crane bridge.

Belt Splicing — In a Hurry

DOWNTIME requirements for splicing conveyor belts can be considerably lessened, according to the description of a new method announced by the Flexible Steel Lacing Co., Chicago.

Templates eliminate the necessity

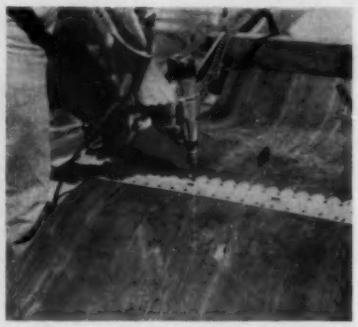


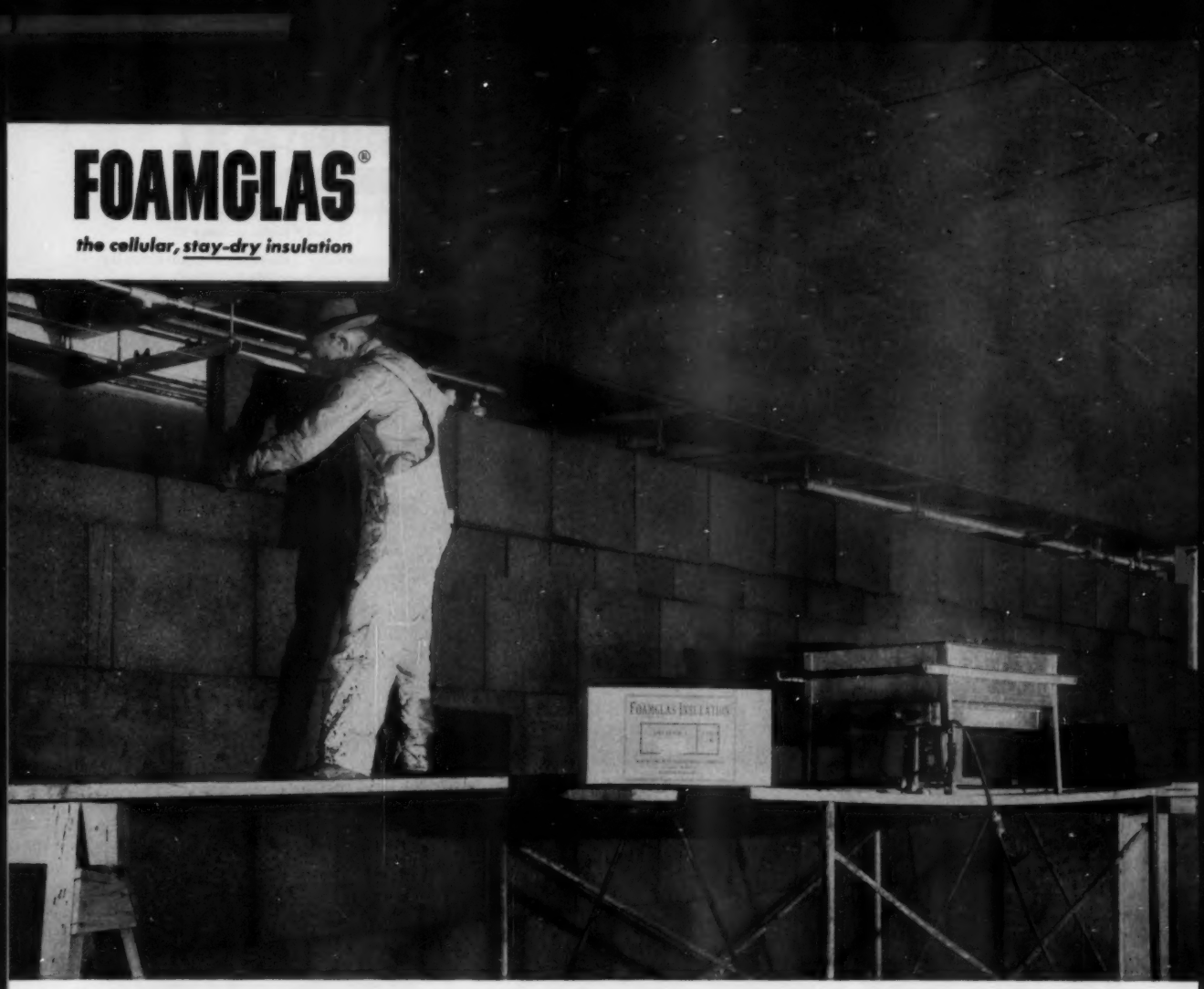
Fig. 1. Power tool boring bit is used to bore holes in a belt for fasteners

Fig. 2. Belt end, drilled, is lifted over the bolts held in position by template

Fig. 3. Operator runs nuts tight as coworker breaks off excess bolt-lengths

FOAMGLAS®

the cellular, stay-dry insulation



In new —20°F. hardening room . . .

Carnation cuts construction costs with free-standing insulating wall of FOAMGLAS

The Carnation Company, Oakland, California, built this free-standing insulating wall entirely of FOAMGLAS. The free-standing wall enabled them to cut construction costs for their new —20° F. ice cream hardening room. FOAMGLAS made this possible because its rigidity and unusual strength enabled it to function as *both* insulation and structural wall. Not even temporary supports were needed.

Carnation also used this unique cellular glass insulation for all other walls plus the floor and ceiling of the room. Its sealed glass cells mean FOAMGLAS stays dry, its insulating performance stays constant. That assures dependable temperature control and an end to the headaches and expense of insulation replacement. What's more, heavy loads can't hurt the extra-strong floor insulation.

You, too, will find this unique, *stay-dry* insulation the perfect answer for refrigerated spaces, piping and equipment. Completely inorganic, FOAMGLAS can't warp, shrink or swell . . . is vermin-proof and fireproof as well. Write us today for a free sample and up-to-date literature covering your specific needs.

Pittsburgh Corning Corporation
Dept. PE-76, One Gateway Center
Pittsburgh 22, Pennsylvania
In Canada: 57 Bloor St. W., Toronto, Ontario

With this simple test you can quickly demonstrate for yourself the remarkable compressive strength of FOAMGLAS (over 7 tons per square foot). Write now for a free sample and complete directions for this and five other simple tests . . . easily performed right in your own office.

Pittsburgh Corning also manufactures PC Glass Blocks

For more facts circle 552 on Reply Card

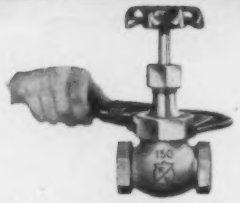
KENNEDY Quality Means *Extra Value* In Every Valve

KENNEDY Fig. 89
Bronze Globe and Angle Valves with
Renewable Composition Disc
150 lbs. Steam - 300 lbs. W.O.G.
¼" to 3"

The valve designed with rugged body construction for trouble-free service, with new disc features for longer service life.

Here is the bronze valve of maximum durability and efficiency. Designed for versatility and longer life, it has rugged body construction with raised seat, generous interior passages, and ample pipe thread clearances. It features the comfortable, safe, pistol-grip handwheel; the Kenalloy stem, designed to eliminate the common causes of stem failures; and new improved impregnated plastic packing material, carefully tested and perfected. All these factors combine to make Kennedy the Quality valve.

• UNION BONNET RING •



Separate union bonnet ring is of heavy construction to absorb greater punishment. Large flats mean easier wrench application.

• SLIP-ON DISC-HOLDER •

With stem turned to wide open position, slip-on disc holder is locked positively in place . . . for easy reassembly.

• REMOVABLE DISC-HOLDER •

With bonnet assembly removed, a mere half-turn of stem releases disc-holder. Accurately guided by four guide prongs.

BRAZING SOCKETS
Fig. 89 is available with brazing sockets. To specify, ad letters "BS" to Figure number of valve.

THE KENNEDY VALVE MFG. CO. • ELMIRA, N. Y.
VALVES • PIPE FITTINGS • FIRE HYDRANTS

OFFICE AND WAREHOUSES IN NEW YORK CHICAGO SAN FRANCISCO ATLANTA SALES REPRESENTATIVES IN PRINCIPAL CITIES

For more facts circle 553 on Reply Card

OPERATION—PRODUCTION

(O and P begins on page 62)

of inserting fasteners individually from the pulley side of the belts during the splice, by holding a row of fasteners in position as the belt end is placed over them.

A boring bit and special wrench have been designed for use in standard electric or air impact tools, and their use will cut in half the time formerly taken to apply fasteners by hand methods.

Photographs show the sequence of operations required to make a splice with the tools. Field tests by the manufacturer show that a two-man team can apply fasteners on a 30-in. wide belt joint in 15 to 20 minutes.

Storage Rack Construction Speeded with Slotted Angles

To PROVIDE additional storage space for various sizes of glass sheet, used in the manufacture of storm windows and doors, a Chicago manufacturer

Portion of one storage rack constructed of slotted angle, to store glass sheet

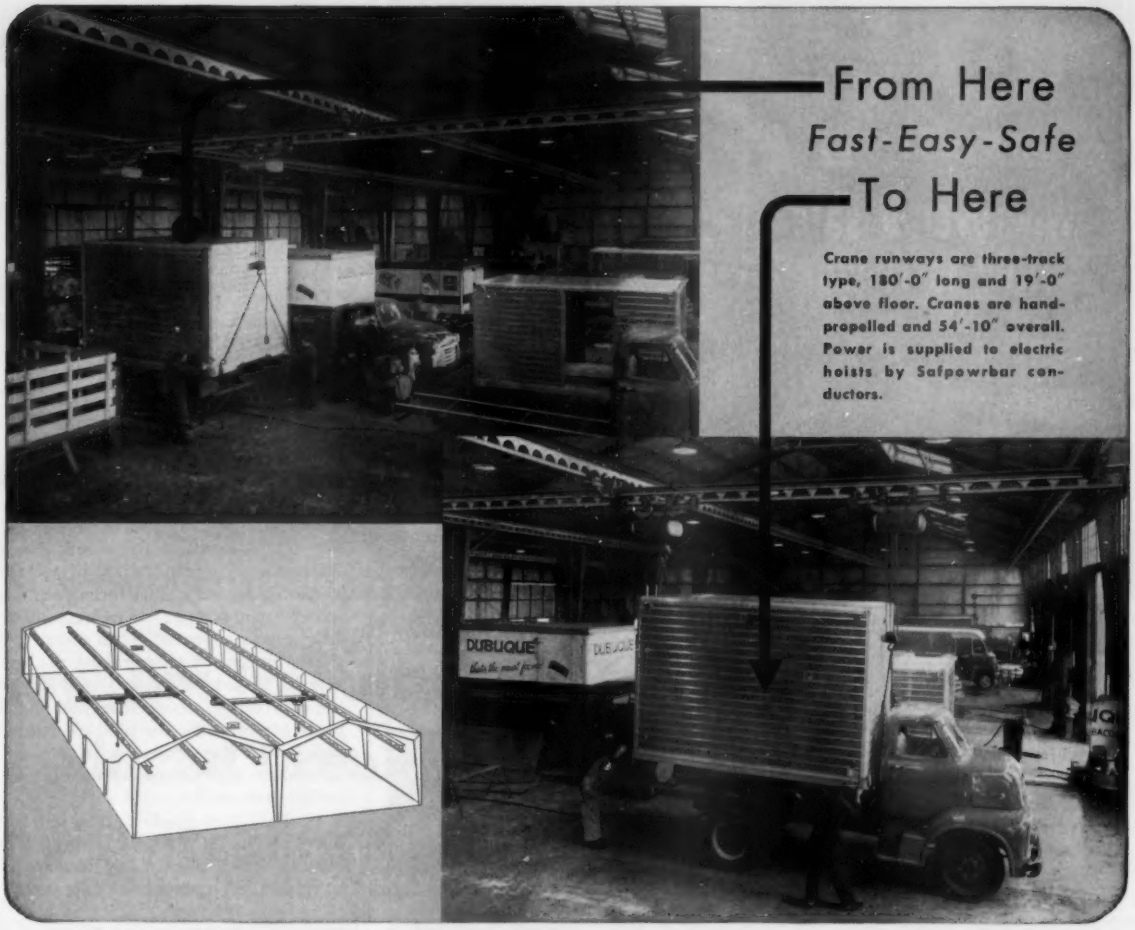
revised glass storage procedure, and has reduced breakage substantially.

The usual practice of leaving glass sheets in the boxes in which they were received created problems of waste from breakage and chipping, and space problems in the arrangement of boxes in the available storage space.

To solve the problems, two racks, each 21 ft long, five feet wide and six feet high, were built from Dexion slotted angle, a steel framing material manufactured by Acme Steel Co. of Chicago. Each rack has 14 bins, each three feet square with a load capacity up to 3000 lb of sheet glass, stored on edge. Pressed wood panels, four feet by eight feet by one-quarter inch, are used for bottoms and sides.

Two men worked two days to erect each rack, using 1600 ft of Dexion for each rack. Easily cut, and pre-

TRAMRAIL TRANSFER CRANES
SPEED BODY WORK


From Here
Fast-Easy-Safe
To Here
Crane runways are three-track type, 180'-0" long and 19'-0" above floor. Cranes are hand-propelled and 54'-10" overall. Power is supplied to electric hoists by Safpowrbar conductors.
DUBUQUE

TRUCK and trailer bodies are big, heavy and awkward to handle. It takes considerable time to move them from one point to another by ordinary means. With an overhead Cleveland Tramrail transfer crane system, however, the work is made simple, easy and fast.

C & C Trailer & Body Co., Oakland, California, erected a plant consisting of two prefabricated Soule Steel buildings assembled together, side by side. A 3-ton, 3-runway transfer crane was installed in each. Two cross-over spurs were provided, permitting a load being transferred from one crane to the other. Bodies, or other loads, can therefore be picked up at any point in the entire plant and delivered directly to any other point.

The smooth rolling cranes are always ready to provide handling service any place in the plant. They eliminate a great deal of unnecessary motion. Handling time is reduced and production speeded, resulting in lower costs.

GET THIS BOOK!

BOOKLET No. 2008. Packed with valuable information. Profusely illustrated. Write for free copy

CLEVELAND TRAMRAIL DIVISION
THE CLEVELAND CRANE & ENGINEERING CO.
7508 East 290th Street, Wickliffe, Ohio

CLEVELAND TRAMRAIL
OVERHEAD MATERIALS HANDLING EQUIPMENT

For more facts circle 554 on Reply Card

Use SAFETY GRIP-STRUT grating

Wherever a safe footing is required

Grip-Strut circular stairway on Shell Oil tank in Portland, Ore.

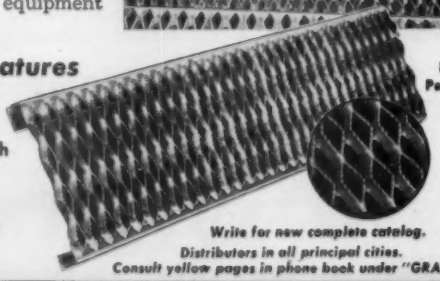
See how Shell Oil uses Grip-Strut for a safe ramp between tanks.

View looking down circular stairway on Shell Oil tank shown above.

SAFETY GRIP-STRUT is the new basic material, all in one piece (including channels), not welded, riveted or expanded in steel or aluminum, in standard sizes and gauges. Safety GRIP-STRUT presents an open space, in a diamond pattern, in excess of 55% of the area for ready access of light and air and gives a positive NON-SKID footing in all directions. Ideal for work platforms, stair and ladder steps, flooring, balconies, catwalks, machinery guards, fire escapes and for original equipment safety treads.

Important Safety Features

- ★ Fire proof
- ★ Slip proof
- ★ Maximum strength
- ★ Minimum weight
- ★ Easy to stand on
- ★ Cool in summer—warm in winter



Pat. Pending

Write for new complete catalog.
Distributors in all principal cities.
Consult yellow pages in phone book under "GRATING"

GRIP-STRUT division
THE GLOBE COMPANY • *Manufacturers since 1914*
4016 S. PRINCETON AVE. • CHICAGO 9, ILL.

For more facts circle 555 on Reply Card

OPERATION — PRODUCTION

(O and P begins on page 62)

slotted to receive fasteners (thus requiring no drilling or welding) the use of slotted angles was considered responsible for a savings of one-third in assembly time.

Magnified TV Speeds Microscopic Inspection of Blades

IMPROVED PRODUCT QUALITY and production is the result of the installation of an RCA closed-circuit television system in the Cincinnati Machine Shop of the American Can Co. Canco personnel credit the "TV Eye" installation with a 100 per cent increase in production.

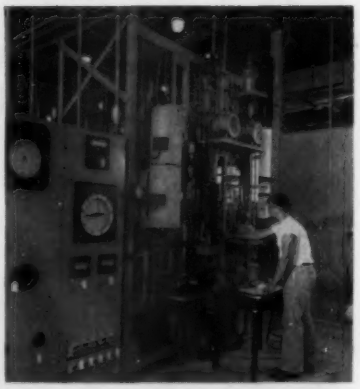
The TV system is used to provide remote microscopic inspection of thin scraper blades used in lithography coating presses. The compact camera is installed so that it focuses on the blades through a microscope and projects the image, magnified 288 times, on a 21-in. receiver a few feet away.

Prior to the installation, inspection of the blades was done through a 30-power microscope, and inspector fatigue was contributing to error.

The chrome-plated scrapers are examined by passing them slowly under the microscope. As each section of the blade passes under the lens, its magnified image is reproduced on the TV screen as a horizontal bar approximately four inches wide.

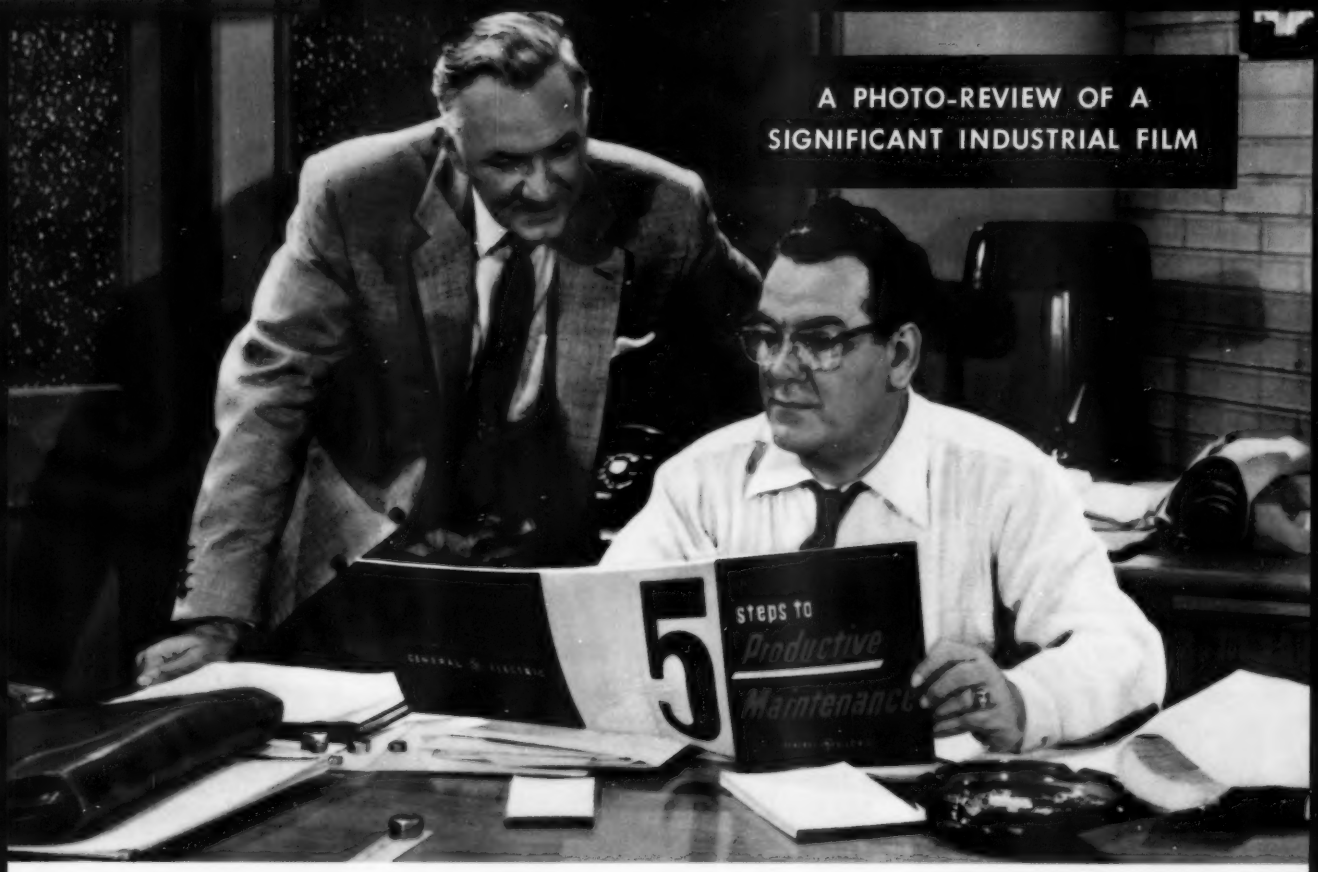
Vertical lines on the screen indicate tolerance limits, and the inspector is able to detect quickly any blade with irregularities in excess of tolerance.

Floor Grating Supports Research



Unusual application of floor grating is one feature of new Universal Oil Products Co. lab. Grating permits flexibility of research project setups, since equipment is easily mounted and dismounted

For more facts circle 556 on Reply Card



How Jim Hamilton of Dawson & Egglesby reduced breakdowns, increased output by switching to *Productive Maintenance*

1 IT ALL BEGAN (in this film) when Maintenance Superintendent Jim Hamilton's wedding anniversary party was interrupted by the telephone. . .

2 . . . a breakdown at the plant! Same thing on his birthday, too — just as he was blowing out the candles. In fact, the phone rang every time the Hamiltons planned something.

3 Telephonitis was afflicting Jim. It seemed the phone was always ringing to announce a breakdown at the plant. So, his doctor suggested a hobby.

GENERAL ELECTRIC

PLEASE TURN PAGE

CONTINUED FROM PRECEDING PAGE

Emergency equipment downtime was

4 That's why Jim bought a gun. He decided to hunt ducks and showed his son how it is done. The question was: when could he find the time?

5 He'd have to guarantee himself time. So he planned to isolate three days against every kind of maintenance trouble. He drew up work orders and schedules for his men.

6 They pitched in. They greased, tightened, adjusted, overhauled. And to make sure Jim got his trip, one main drive motor was greased twice.

...then he called in his General Electric

10 The cost of repairing the motor was only one of Jim's worries. More important, men and machines were idle . . . production stopped.

11 Downtime was costing a lot of money and Jim's boss, Egglesby, "Old Eaglebeak," wasn't very happy. Jim decided to call his General Electric Service Shop for assistance.

12 To George, the General Electric maintenance specialist, Jim's problem was nothing new. He told Jim he'd be over right away.

...and saw how his problem could be solved

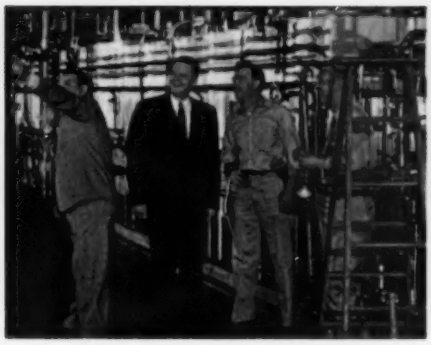
16 George pulled out some literature from his brief case and showed Jim the advantages of General Electric's *Productive* Maintenance plan...

17 "There are five steps in this new approach to maintenance. First, gather complete equipment data from your machines and motors, and compile a record system.

18 "Second, determine the amount of routine maintenance needed by deciding how much care is warranted by the function and cost of the equipment.

GENERAL ELECTRIC

becoming a major problem for Jim Hamilton...



7 When they were finished, the plant looked like a battle cruiser ready for the admiral. Jim was demonstrating his shooting technique when . . .

8 . . . in spite of all the overhauling and greasing they had done, one of the main drives broke down. Jim slumped as he saw the whole production line coming to a standstill.

9 Up in smoke went the main drive and up in smoke went Jim's hunting trip. Apparently a lot of maintenance wasn't the answer either.

maintenance specialist for help...

13 Jim explained his problem: what he needed was a crystal ball to tell him in advance when and where those expensive breakdowns would occur.

14 "You can have a crystal ball," said George, "part of it will be a record system that will tell you when to inspect, when to overhaul, and what your upkeep costs are . . .

15 "The rest of your crystal ball will be any good inventory control system to keep track of renewal parts. Two systems make your crystal ball."

with General Electric's *Productive Maintenance* plan...

19 "Third, put your records to work. Set up a routine operating control system, with regular inspection cycles, work orders, and spare parts stocks.

20 "Fourth, inspect and evaluate all equipment *vital* to production continuity, to help you determine critical parts protection and overhaul requirements.

21 "Fifth, establish a critical maintenance program: schedule overhauls to reduce breakdowns. Stock parts to minimize downtime cost."

...to help raise productivity, cut product cost...

PLEASE TURN PAGE

CONTINUED FROM PRECEDING PAGE

So Jim Hamilton set up his own *Productive* Maintenance program . . .

22 Jim, sold on *Productive* Maintenance, started his own program at once. Electric equipment needing overhaul was scheduled into nearest General Electric Service Shop.

23 And the stock room at Dawson & Egglesby became a model of efficiency. Now, when critical parts for key machines are needed, they're always available. As for Jim, well . . .

. . . licked his maintenance problem . . . and made his management happy!

24 . . . he always bags his limit now when he goes duck hunting. The Hamiltons never miss an anniversary celebration. And Jim's telephonitis . . . that's been cured for good.

25 One more thing: Jim's boss Egglesby, "Old Eaglebeak," was delighted. He saw production up and maintenance costs down. What management wouldn't be delighted?

How your General Electric maintenance specialist can help organize a *Productive Maintenance* program

Now that you've reviewed the highlights, SEE G.E.'s FILM: "PRODUCTIVE MAINTENANCE"

General Electric Company
Apparatus Sales Division, Section 801-19 DD
Schenectady 5, N.Y.

I would like to schedule a showing of your film "*Productive* Maintenance."

Please send me the detailed manual (GEA-6087) on setting up a *Productive* Maintenance program in my plant.

NAME_____

POSITION_____

COMPANY_____

CITY_____ STATE_____

1. Supplying Complete Parts Data. He can identify all renewal parts in each unit of electric equipment to complete basic records.

2. Planning Routine Maintenance and Inspection. He can offer upkeep guidance and help organize inspection trips and routine maintenance by examining your equipment and establishing the periodic checks needed.

3. Establishing Routine Renewal Parts Inventory. He can tailor a renewal parts program to your plant, help you set up a parts inventory system.

4. Analyzing Critical Equipment for Best Protection. He can tell you how long repairs will take and the cost per job, plus recommending major spare parts protection.

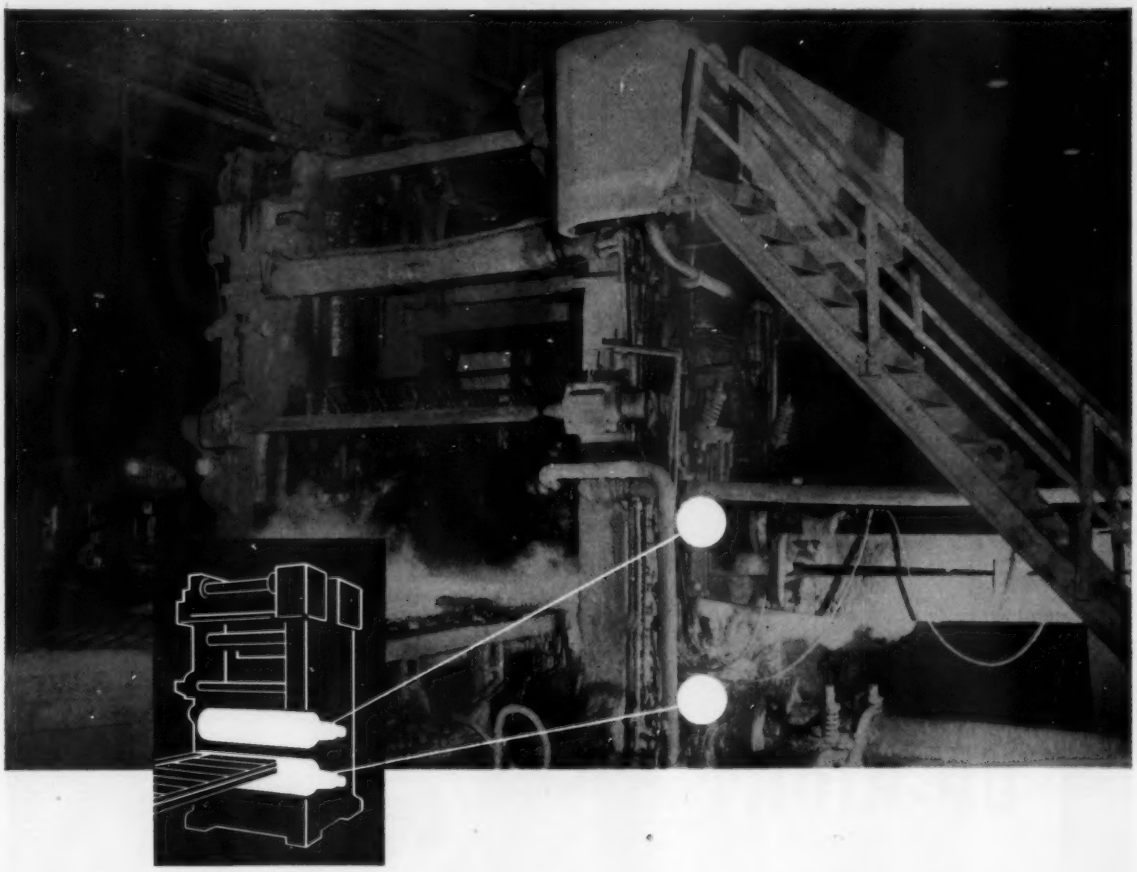
5. Determining Condition of Critical Equipment. He can assess the condition of such equipment, and schedule men and machines at the nearest of 51 G-E Service Shops, to help you during planned overhauls.

To put *Productive* Maintenance to work for you call your nearest G-E Apparatus Service Shop or Sales Office.

Productive Maintenance **as vital as production itself!**

GENERAL ELECTRIC

Lubricating roll necks is no easy job



Lubricating the roll necks of a steel mill calls for a lubricant that will resist high temperatures. The lubricant must also function in the presence of steam, water, mill scale and other abrasive materials. It has to cushion great shock loads and cling tenaciously to the bearings it protects. It must last a long time... and it must be economical in use.

Atlantic Lubricant 10 performs exceptionally well in this service. It is being used in a pressure system on the mill illustrated, at the Lukens Steel Company in Coatesville, Pa., for the lubrication of roll neck bearings, pinion and spindle bearings.

Selecting the correct lubricant for the job is simplified when you call in your Atlantic Lubrication Engineer. He is a man with years of on-the-job knowledge of heavy industrial lubrication requirements of all kinds.

Why not see for yourself the value of Atlantic service? Just write, wire or phone the office nearest you for full information. The Atlantic Refining Company, Dept. M-7, 260 South Broad Street, Philadelphia 1, Pa.

PROVIDENCE, R. I.
430 Hospital Trust Bldg.

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LUBRICANTS · WAXES
PROCESS PRODUCTS

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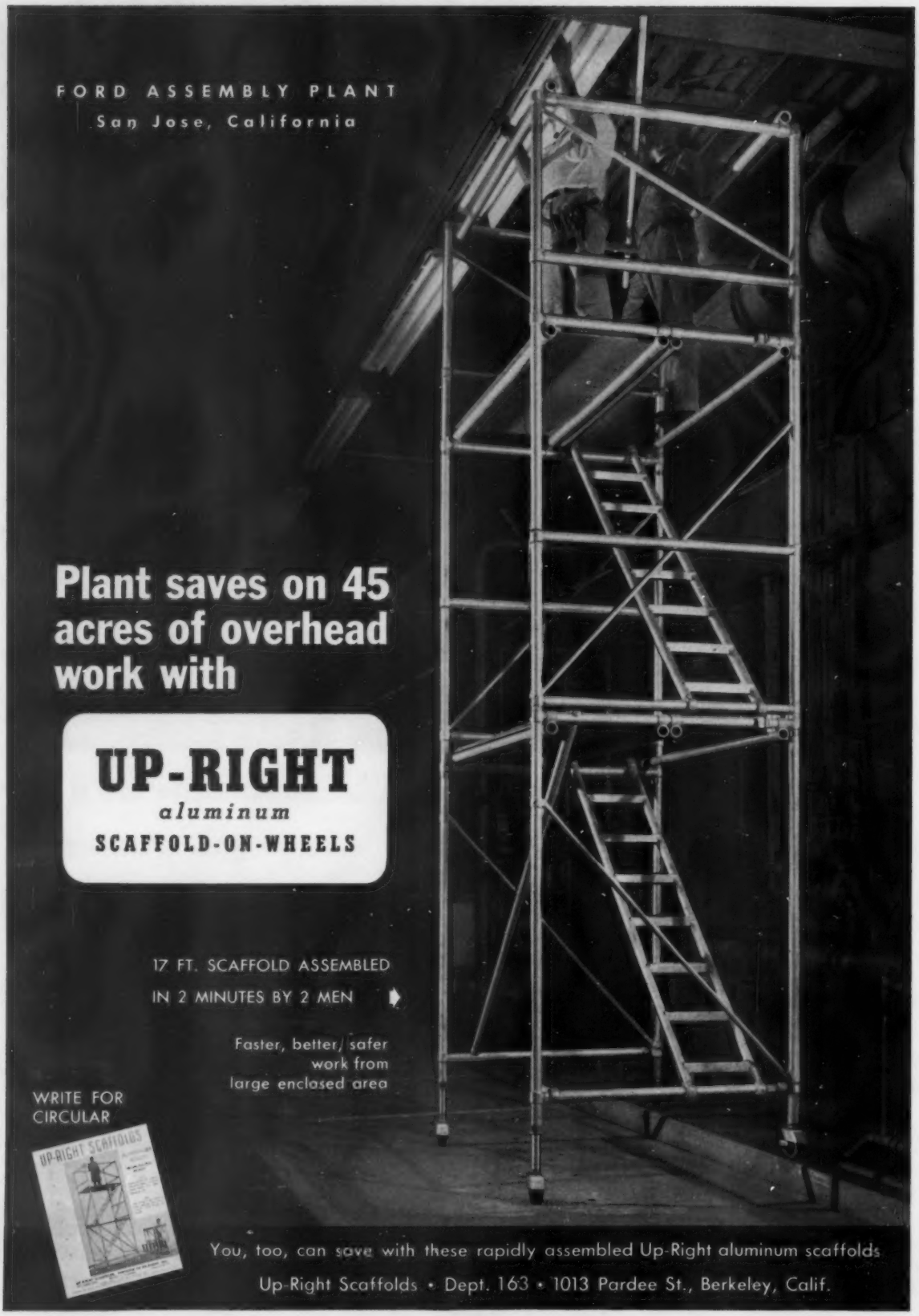
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COURT DECISIONS — a summary of legal findings of interest to the plant engineer

Prepared by Albert Woodruff Gray

Reasonable Use of Property

FIRE IN A business building in San Francisco destroyed the goods and equipment of a second story tenant. On the lower floor and in the basement another tenant had stored between 750 and 1000 gal of highly inflammable paint thinner.

Suit was brought by the second story tenant against the possessor of this paint thinner—although that company was in no way responsible for the origin of the fire—for a recovery of this fire loss. In its defense, this lower floor tenant contended that it was not liable for damages merely because its materials contributed to the spread of the fire which had not been caused by its acts.

"The general rule," said the court, in holding the tenant of the lower floor responsible for the loss, "is that the possessor of land is required to make reasonable use of his premises and cause no unreasonable harm to those of the vicinity either by reason of the character of the use itself or because of the manner in which it is conducted.

"If the owner of premises allows them to remain in such a condition as to constitute a danger to other property in case of fire, this negligence will make him liable for damages done to such other property by the accidental fire starting on his premises although he has no connection with its origin." Reid & Sibell, Inc. v. Gilmore & Edwards Co., 285 Pac. 2d 364, California, June 24, 1955.

Printing Plant Noises

A PRINTING PLANT was criminally guilty of maintaining a public nuisance in permitting "great, unusual and unnecessary noises to be made during the daytime as well as the night time by the operation of its machinery, motors and presses . . . permitted and allowed such machinery, motors and presses to be operated in such manner as to cause divers houses in said neighborhood to vibrate."

The Court of Appeals of New York State, in setting aside the conviction of this printing plant in the lower court, said,

"In view of the character of the neighborhood and the manner in which this printing plant was conducted, we think the evidence is insufficient to sustain the conclusion that what was done in the operation of this plant amounted to a public nuisance."

The court supplements this ruling with a quotation from another case in which a brass foundry had operated in an industrial area until three o'clock in the morning. The noise of the machinery seriously disturbed the usual sleeping hours of those in the neighborhood.

"The business is lawful," said the court in that case, "and for that reason its operation may not be held to constitute a public nuisance unless it appears that it is being operated improperly, negligently or in some other manner unlawfully." People v. Cuneo Press, 177 N.E. 422, New York; People v. Accurate Brass Co., 69 N.Y.S. 2d 306, New York.

Trade Secret Disclosures

EMPLOYED IN the development of a soap formula under a contract not to disclose the trade secrets he would learn in this employment, a research chemist left that company for a similar position with a competitor.

In the action by the first employer against the competitor hiring this chemist, damages were claimed for the appropriation of these trade secrets which the competitor had surreptitiously secured through the disloyalty of this employee.

"Unless otherwise agreed," the court said in its decision, "after the termination of his employment the employee has no duty not to compete with his employer, but is subject to a duty to the employer not to use or disclose to other persons on his own account or on account of others in competition with that employer or to his injury, trade secrets, written lists of names or other similar confidential matters given to him only for the employer's use or acquired by the employee in violation of duty.

"The employee may use general information concerning the method of business of the employer and the names of customers retained in his memory, if not acquired in violation of his duty as an employee.

"However, one who discloses or uses another's trade secret without the privilege to do so is liable to the other if (a) he discovers the secret by improper means; or (b) his disclosure or use constitutes a breach of confidence reposed in him by the other in disclosing the secret to him; or (c) he learned the secret from a third person with notice of the fact that it was a secret and that the third person discovered it by improper means or that the third person's disclosure of it was otherwise a breach of duty to the other; or (d) he learned the secret with notice of the fact that it was a secret and that its disclosure was made to him by mistake." Carter Products v. Colgate-Palmolive Co., 130 F.S.554, Maryland, March 10, 1955.

Advertising for Labor

FROM A DECISION, holding unconstitutional a California statute forbidding an employer advertising for labor during a strike without plainly stating in the advertisement the existence of the strike, the state appealed.

This statute states, in part, that if any person advertises for employees by means of newspapers to work at a plant while a strike is in active progress, "He shall plainly and explicitly mention in such advertisements that a strike, lockout or other labor disturbance exists."

In this instance, the advertisement had been carried by the Los Angeles Examiner without this statutory statement. In a decision that the law was constitutional, and reversing the earlier judgment, the appellate court said,

"The legislature was trying to protect workers against the form of misrepresentation of which there has been much complaint in the past, in which employers who had labor troubles, sought employees without notifying those approached that such labor troubles existed.

"Words used in creating a statutory crime do not fail of uncertainty merely because the offense when viewed through them may not have all the precision in outline of a geometrical figure. If the main and central part of the field is clear some slight lack of definition around its outer edges is not fatal." People v. Smith, 284 Pac. 2d 203, California, May 18, 1955.

Anti-Smog Statute

CHARGES AGAINST plants in the Los Angeles, California, area of violations of the anti-smog statute of that state recently came before an appellate court for review. The plant contended that this statute was so vague and indefinite that it was unconstitutional.

In part this statute reads, "A person shall not discharge into the atmosphere from any single source of emission whatever, any air contaminant for a period or periods aggre-

COURT DECISIONS

gating more than three minutes in any one hour, which is (a) as dark or darker in shade as that designated No. 2 on the Ringelmann chart as published by the United States Bureau of Mines, or (b) of such opacity as to obscure an observer's view to a degree equal to or greater than does smoke in subsection (a) of this section."

This law, the court held, was constitutional. "The standard made use of in subsection (a) is sufficiently definite. In proving a violation, a witness may testify although he did not have a Ringelmann chart actually in the field with him at the time he made his observation. One does not have to have a color chart in his hands to recognize a red flower, a blue sky or a black bird. "Nor do we see any difficulty arising from the fact that a plume of smoke, for example, may appear less dark than Ringelmann No. 2 from one position but darker than Ringelmann No. 2 from another view point. If the smoke, fairly viewed from any position, has a shade as dark or darker than Ringelmann No. 2 it is condemned, no matter how light in color it may look to some one at another vantage point." People v. Plywood Mfg's. of Cal., 291 Pac. 2d 587, California, November 21, 1955.

Employment by Competitor

UNDER AN EMPLOYMENT contract of an adhesive tape manufacturer, it was stipulated, "Employee, for a period of three years after leaving the company's employment for any reason whatsoever, shall not, in the United States or Canada, without first obtaining company's permission, engage in or enter the employment of any person, firm or corporation engaged in or about to become engaged in the manufacture of adhesive or adhesive tapes."

Later the employee left and accepted employment with a competitor and this former employer sued to prevent him from continuing in that employment. In denying the former employer this relief, the court summarized the law governing employment contract limitations of this character.

"While an employer under a proper restrictive agreement can prevent a former employee from using his trade or business secrets and other confidential knowledge gained in the course of his employment and from enticing away old customers, he has no right to unnecessarily interfere with the employee following any trade or calling for which he is fitted and from which he may earn his livelihood, and he cannot preclude him from exercising the skill and general knowledge he has acquired or increased through experience or even instructions while in the employment. Public policy prohibits such undue restrictions upon an employee's liberty of action in his trade or calling." Donahue v. Permacel Tape Corp., 127 N.E. 2nd 235, Indiana, June 20, 1955.

Agreement Not to Compete

IN A CONTRACT for the sale of a Missouri glass plant, one clause read, "As an inducement to the said sale and as part of the consideration therefor, the sellers and each of them agree not to engage as individuals or in association with others or as officers or employees of the corporation in the business of handling at retail or wholesale the sale of glass in any form or for any use within a radius of 25 miles of Kansas City."

When one of the sellers established a g'ass plant in that city a year and a half later and solicited the patronage of his former customers, the purchasers of the plant sued for an injunction.

In defense to the action it was claimed that a clause of this character was illegal as a restraint of trade. "It is not an unlawful restraint of trade," said the court in its decision, "that this seller must refrain from further competition as he had agreed. These owners had the right to sell the goodwill of their business and the power to exclude their own activity from competition with the purchaser. The interest of the public was not involved to such an extent that it would prohibit such a transaction. It did not create a monopoly. There were other competitors. The sellers received payment for an intangible asset and full compensation for all their property transferred to the purchaser. Goodwill is property recognized and protected by the law." Kreger Glass Co. v. Kreger, 49 S.W. 2d 260, Missouri.

Use Tax Exemption

ORDER FOR A refund by the State of Alabama to a copper company of $2,935.66, paid by the company in use taxes on tool steel, bars, rods, pipe and sheets, was affirmed by the Supreme Court of that state.

The law in that state exempts from this tax "machinery which is used for mining, quarrying, compounding, processing or manufacturing tangible personal property and the parts of such machines, attachments and replacements therefor which are made or manufactured for use on or in the operation of such machines and which are necessary to the operation of such machines and are customarily so used."

The articles on which these taxes were assessed were machines, parts, attachments and replacements used in the operation of machines, which in turn were employed in the manufacture of products sold by the company.

"It is argued," said the court, of the contention of the state that the plant was subject to this tax, "that the company is a manufacturer and is claiming exemptions for material because it is the manufacturer, although the machines and materials there involved were used by it, not in the manufacture of personal property for sale but for its own use. The effect of the state's argument would be to penalize the taxpayer because it prefers to practice economy and conservation of money, time and effort and manufacture its own machines and parts for machines with which it in turn manufactures tangible personal property for sale." State v. Calumet & Hecla Consolidated Copper Co., 82 So. 2d 232, Alabama.

Noises in an Ice Plant

ACTION WAS brought against the owner of an ice manufacturing plant in which it was contended that the incessant jar and vibration from operating the plant seriously impaired the health of those in the neighborhood and the enjoyment of their property.

This building, with its machinery, represented the investment of over half a million dollars. The plant was located in an industrial area and to operate it economically and successfully, it was operated continuously.

An injunction against the operation of the plant was granted by a lower court on the ground that the people living nearby had been prevented from obtaining adequate sleep and suffered from nervous exhaustion.

Setting aside the injunction and reversing the judgment against the ice plant owner, the appellate court said, "The general rule is that mere discomfort to persons living in adjacent property does not furnish a reason for forbidding the use of one's property, conducted without negligence and with proper appliances, particularly when the property is located in the business and industrial section of a city."

The court modified this statement as follows: "The rule varies with the circumstances of each particular case and injunctions are granted or withheld according to the facts of each case, including the location of the property, the necessities and the degree of discomfort." Haber v. Paramount Ice Corp., 267 N.Y.S., 349, New York.

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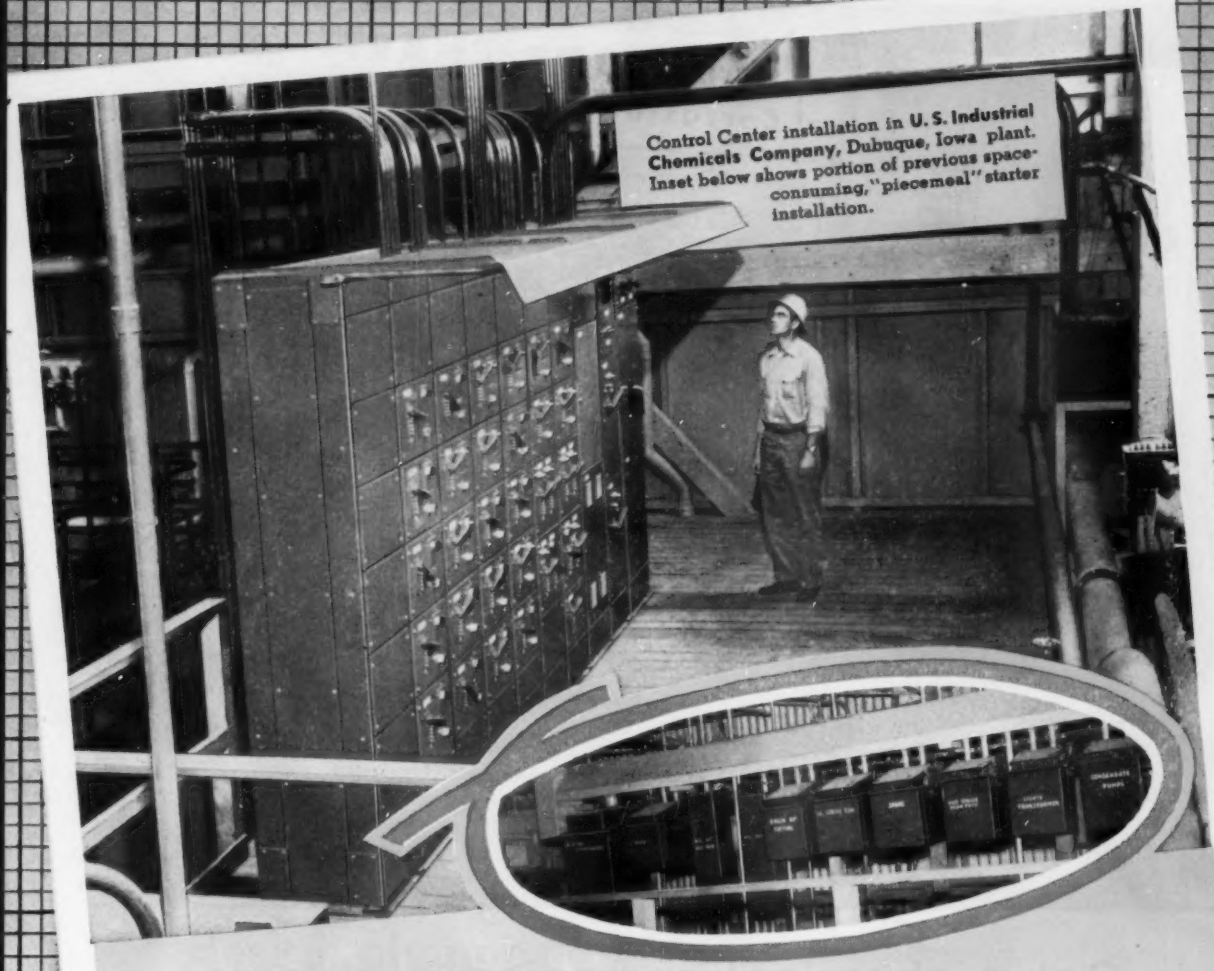

Control Center installation in U. S. Industrial Chemicals Company, Dubuque, Iowa plant. Inset below shows portion of previous space-consuming, "piecemeal" starter installation.

"COMPARISON convinced us that a SQUARE D Control Center offered us MORE!"

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INCREASED SAFETY because bus bars are fully enclosed, rigidly supported and have ample cross section. Circuits are isolated by individually enclosed plug-in units. Disconnect handle designed for maximum operator protection.

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SPACE ECONOMY, TOO. Up to six combination starters fit in a 20" x 20" x 90" section. Plug-in unit heights designed in space-saving increments of 3 inches.

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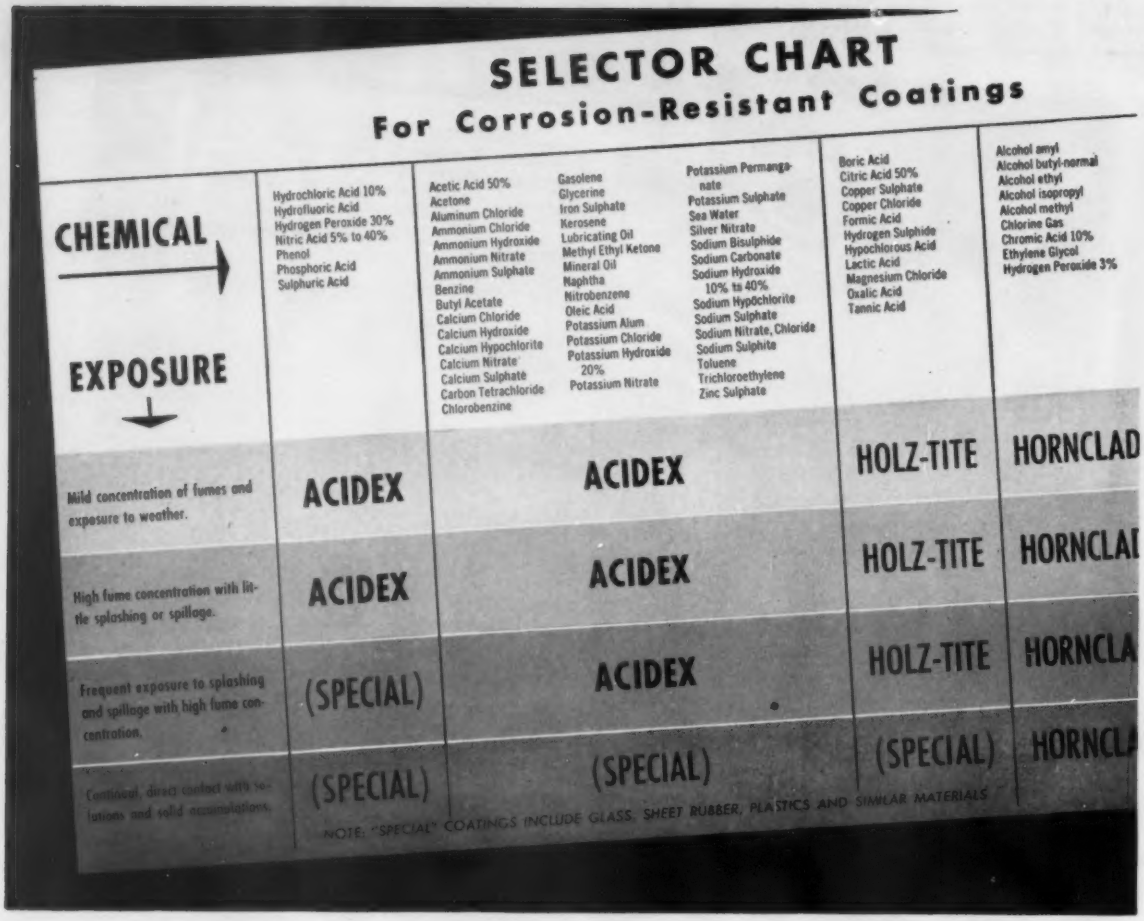

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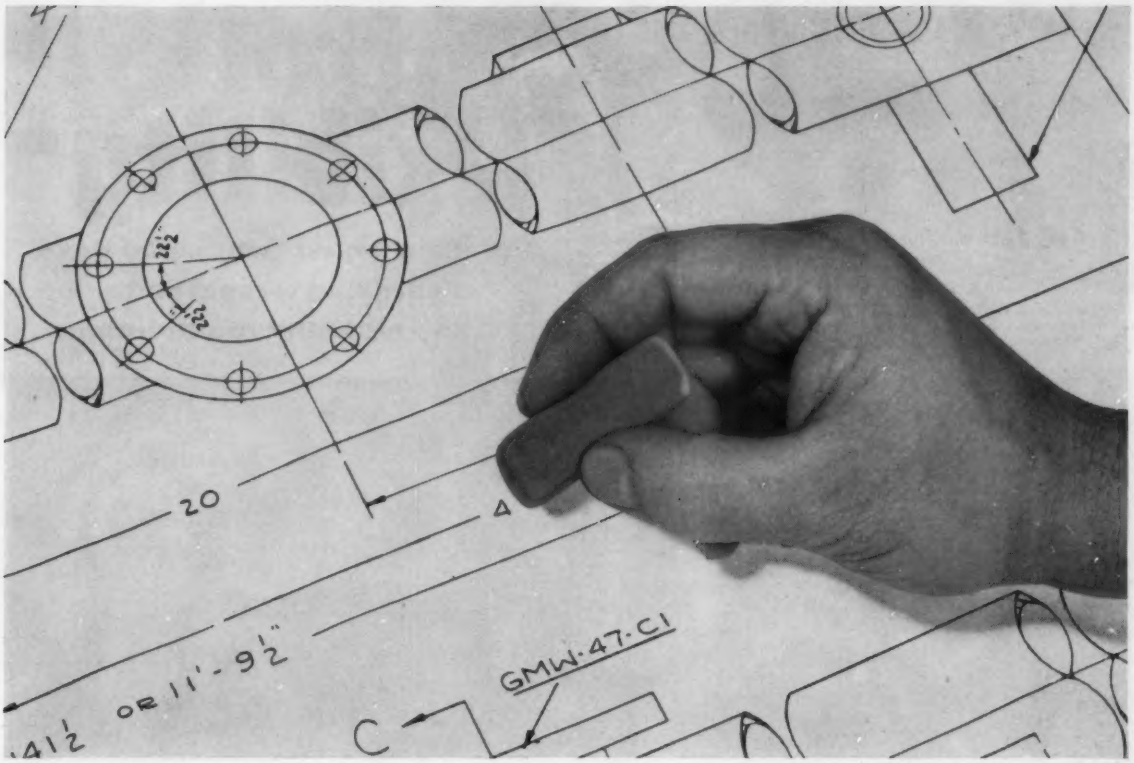

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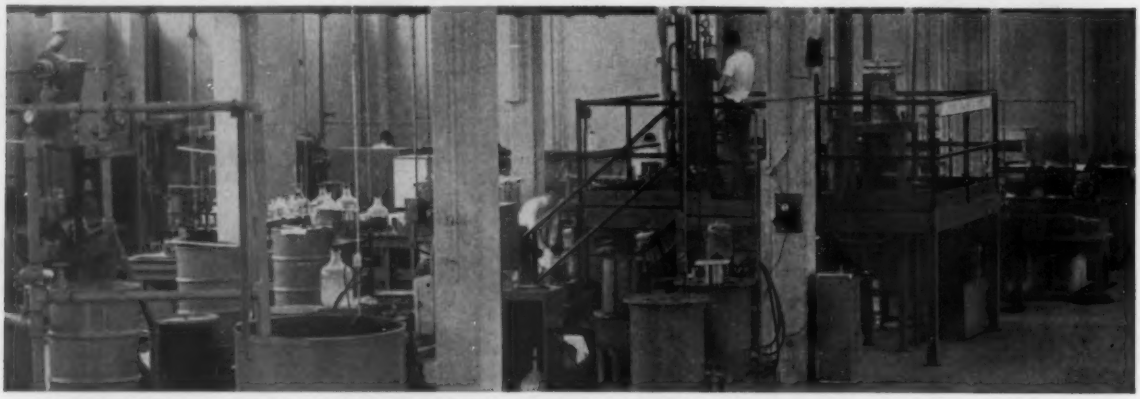
Research Laboratory, The Mead Corporation, Chillicothe, Ohio. Lorenz & Williams, architects, Dayton; Schweiger Heapy & Associates, mechanical engineers, Dayton.

Control Flexibility—

● It's a "must" when you have diversified temperature and humidity requirements



Strategically located Johnson Thermostats operate Valves and Dampers on six large heating and ventilating units serving the spacious pilot plant laboratory.

Stress and strain breaking points of Mead carton stock are tested in a constant temperature and humidity room. Perfectly conditioned air is supplied by a built-up air conditioning unit under the highly accurate control of a Johnson Recorder-Controller.

Printing research is among other activities conducted under carefully controlled temperature and humidity conditions. Sensitive Johnson Room Thermostats, controlling mixing dampers on a central double duct air conditioning system, produce the exact conditions required.

The extensive research and development program of The Mead Corporation, one of the nation's leading papermakers, offers an interesting example of the varied temperature and humidity control needs of today's industrial buildings. At Mead, these include:

- Control of a central double duct air conditioning system serving laboratories, offices, library and public areas.
- Control of a separate air conditioning unit for a constant temperature and humidity laboratory (temperature, 75°F; rel. humidity, 50 per cent).
- Control of a variable temperature and humidity test room to maintain any temperature from 50° to 100°F and any relative humidity from 20 to 80 per cent.
- Control of combination heating and ventilating units for a pilot plant laboratory.
- Weather-compensated control of the hot water baseboard radiation system.

A Johnson-engineered Pneumatic Control System easily provides the necessary flexibility to satisfy each one of these requirements . . . *and with a precision that insures virtually waste-free heating, cooling and ventilating operation!*

This system, like the Johnson Systems in countless other industrial buildings, was designed and installed to meet the exact needs of the individual building. Regardless of how complex or diversified your control problems may be, you can count on this traditional Johnson policy to provide your plant with an equally successful, flexible control system.

Next time you have a temperature, humidity or process control problem, talk to an engineer from the specialist Johnson organization. His recommendations are yours without obligation. Johnson Service Company, Milwaukee 1, Wisc. Direct Branch Offices in Principal Cities.

JOHNSON CONTROL

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PLANNING • MANUFACTURING • INSTALLING

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Company decided to install a central heating and circulating piping system for its hot water service . . . Various piping materials were tested before final selection was made . . . Tests on these materials were conducted over a three-year period . . . Results are given in article

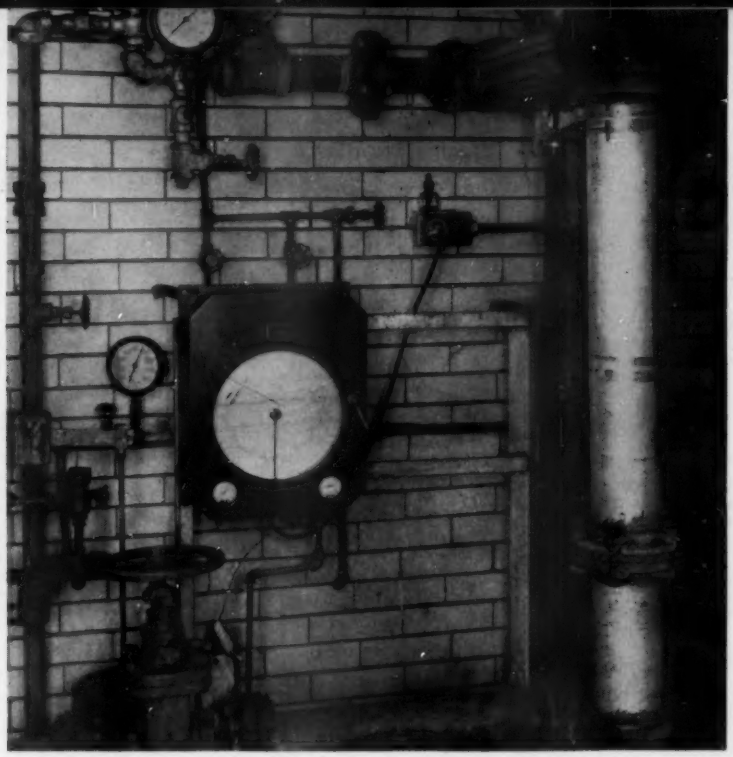


Fig. 1. Illustration shows automatic controls for blending 220 F water with cold water in order to reduce temperature to 160 F for plant's lavatory system

Aluminum Pipe Was the Answer

Based on Tests, It Was Selected for Plant's Hot Water Service

By C. J. ZETLER, JR., Works Engineer, Westinghouse Electric Corp.

FOR MANY YEARS the East Pittsburgh works of the Westinghouse Electric Corp. supplied hot water for lavatory and building cleaning use by means of steam and gas heated water heaters. These heaters were located adjacent to the hot water use point and the small size of piping and the short runs required, permitted the use of copper pipe without much consideration being given to the cost of the piping. The real expense was the installation and maintenance of the water heaters.

Another serious problem was the temperature of the water. Control equipment failures were an almost daily occurrence at some location, with the result of either too hot or too cold water being supplied. Water too cold produced only complaints, but water at boiling temperatures, plus flash steam, created a hazard condition.

An engineering study of the hot water problem was made by the works engineering department, which resulted in the decision that the most satisfactory method of supplying hot water to all locations in the plant would be by means of a central heating and circulating piping system. The ideal location for the heating system was in the power house where low pressure steam at 5 psi is available from turbine extraction at all times, and where the operators are able to take care of the water heating and circulating equipment as a part of their regular duties.

An additional benefit could be obtained by installing this equipment in the power house. A supply of softened water from the equipment already in use for steam desuperheating purposes was available at an added cost of about two cents per thousand gallons. The added cost was more than offset by the credit for power generated with the steam bled from the turbine to supply the water heating requirements.

The practicability of the installation hinged on the cost of installing and maintaining the circulating piping system. Experience has shown that steel pipe in this type of service is unsatisfactory due to its short life. Copper pipe, with a satisfactory life expectancy, was costly. Wrought iron had possibilities, as did some of the new plastic piping. At this stage in the planning, aluminum pipe was given consideration because it was being produced at prices comparable to wrought iron.

With limited operating experience on hot water service with most of these piping materials, it was decided to install a small circulating system from the power house through one of the manufacturing aisles and a four-story office building. This system was composed of sections of two-inch standard pipe size, using the following materials: wrought iron, copper, brass, plastic and aluminum. Fittings were of similar materials. However, a number of cast iron fittings were also used. Where the taps to the two-inch main were made for the use points, the existing piping, which in most cases was copper, was used. No insulating joints were made between dissimilar metals.

At the end of the two-inch line a one-quarter inch bleeder connection was made into the heating system con-

Fig. 2. Sections of galvanized steel pipe (A) and aluminum pipe (B) are shown after eight years of service in the hot water system. Section of new aluminum pipe (C), in unused condition, is also shown for purpose of comparison

densate return line. The connection provided circulation and returned the bled water to the power plant. This necessitated keeping the condensate return pump on float or liquid level control during the non-heating season.

This trial installation was made in 1946 and, at approximately six-month intervals, sections of the line were removed for examination until 1949 when it was decided enough experience had been gained to justify replacing the entire water heating system in the plant. Aluminum pipe, grade 63-ST-6, was used in this program. With the type of water in the plant at a temperature of 160 F, tests had shown that there was no corrosion or tuberculation of the pipe that could be detected by visual inspection, except where a connection was made to a dissimilar metal. Where connections of this kind were made in the test system, leaks developed in one to two years due to electrolysis. Several repair methods were tried where the dissimilar metals were connected:

1. The use of a waste piece six inches long which could easily be replaced when a leak occurred.

2. The other was the use of an insulating connection between the dissimilar metals. This proved to be the better method.

The complete system in the plant was not installed at one time, but a piping layout was made with the supply lines from the power house of adequate capacity to carry the estimated maximum load in the area to be served. The actual lines were then installed on this basis to locations where it was necessary to remove from service a worn-out gas or steam heated water heater, and all intermediate hot water service requirements between this point and the power plant were connected to the main.

In some cases, this required the entire main be installed at one time and in other cases, six or eight years were required to complete the main. In all cases, a bleeder to the heating system return line was made at the installed end of the hot water main and, if the main is later extended, the bleeder is relocated to provide positive circulation in the entire loop.

In installing these aluminum pipe lines, it was found that adequate expansion loops are necessary. The only failures occurring have been due to lack of expansion clearance, with the pipe breaking at a connection instead of bending laterally as most piping materials will.

The main runs vary in size from four-inch to one-inch standard iron pipe size. Oxy-hydrogen welding has been used satisfactorily on the larger sizes and threaded connections are used on the smaller sizes.

The water temperature is maintained at a constant temperature of 150 F leaving the heating plant, and the temperatures at the end of the lines vary between 150 and 130 F, depending upon the length of line and the amount of water bled from it.

Several steam condensate return lines have been installed, using aluminum pipe, and have given satisfactory service. In these lines the return is a mixture of steam and water, as approximately 15 per cent of the water discharged from the steam traps will flash into steam at atmospheric pressure, and the pressure in the condensate return lines will vary from steam pressure of 150 psi to zero psi, the higher pressure being at the trap discharge and the zero pressure being at the power plant.

At the present time, approximately 10 miles of aluminum pipe are in use on these two services in the plant, with five miles of additional pipe required to complete the installation.

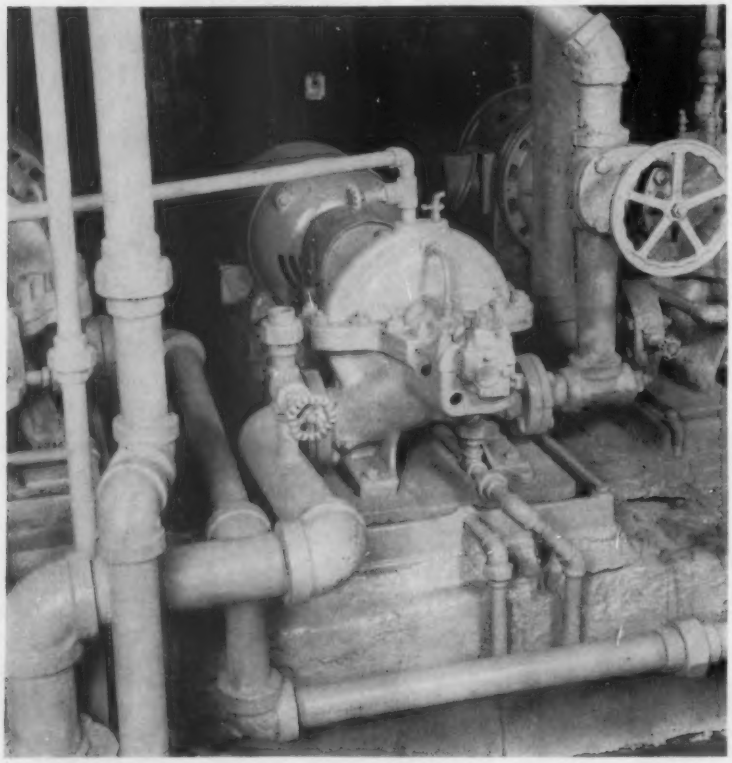


Fig. 3. Pumping unit used in the hot water circulating system. The company tested several different piping materials before making their final selection

Metal Sheath Heaters—

What They Are, How They Work, What They Can Do

By W. L. THOMSON, Manager, Radiant Heater Div., Edwin L. Wiegand Co., Pittsburgh, Pa.

IN THE PAST few years, use of industrial electric heat has progressed from being a curiosity to an economically sound proposition in many processes where heat is required.

Obtaining optimum results requires fitting the heat to the work. This involves a statement of the problem and a definition of the objectives to be gained. Such an analysis would include the following:

1. Type of work
2. Quantity of work
3. Temperatures to be obtained
4. Time to attain the temperature
5. How long temperature is to be maintained
6. Are there corrosion, moisture, abrasion, shock or other conditions involved

Only by a complete definition of the problem is a good application of electric heat likely. It is also essential that a proper understanding exists as to the means by which the heat will flow from the point where it is generated to that where it is used.

First of all, we must consider the theory involved in the production of electric heat. It is a basic physical phenomenon, when an electric current of I amperes flows through a conductor of R ohms resistance, then the power loss in the conductor will be W watts, the magnitude of which is given by the expression $W=I^2 R$. The electrical pressure in the volts E required to push the current I through the resistance R is given by the relationship $E=IR$ and therefore, by substitution, wattage developed in the circuit is $W=E^2/R$.

These relationships apply to both direct and alternating current and tell us that if we wish to develop heat in a wire that we should choose a material of high resistivity. If we wish less heat a material of low resistivity should be used.

Notice that nothing has been said about the temperature level at which heat is developed. This depends upon the rate of loss from the wire which is determined by its physical environment and the ability of that environment to take heat from the resistor.

A resistor of even small wattage when well insulated, as for instance if wrapped in cotton batting, will gradually increase in temperature until the loss from the wire through the cotton batting becomes equal to the wattage input. This is a basic concept and must be borne in mind in the design of every electric heating application.

Usually it is not so much of a trick to develop heat for a given application as it is to distribute it properly and at the correct temperature level.

Careful inspection of the relationships between the current, resistance, voltage and wattage give clues as to what may be expected in the operation of electric resistance heaters.

In a given heater, resistance is constant within narrow limits from the day it is made and throughout its entire life. If the heater is built for operation on, let's say, 100 v, but is operated on 110 v, the wattage developed will vary as the square of the voltage and at the high voltage the heater will deliver 21 per cent more than its rating. An increase in voltage of 10 per cent gives an increase of 21 per cent in wattage developed. If the heater is operated at a temperature close to that which is critical for the materials of which the heater is made, it will not have the length of life for which it is designed.

Voltage is an important factor in heater operation and the operating voltage must be known in order to properly design the heater for a particular application.

Materials of Construction

Modern metallurgy has given us a wide variety of materials from which electric resistance heaters can be made. Nickel-chrome alloys are available for resistance wire and some of these can be operated at incandescent temperatures for periods of time measurable in years.

Resistance wire must be accurately drawn, must be true in diameter and uniform from end to end. Careful drawing and inspection are needed to insure that the resistor material is adequate for the purpose intended. The wire analysis must not vary and the wire itself must be uniform in temper.

Sheath materials must be compatible with the environment in which they are to be used. Temperature and environment indicate what sheath materials should be used, with temperature becoming the limiting factor.

Materials now available permit sheath temperatures up to about 1500 F and at these temperatures heater life is measurable in thousands of hours of operation. Volt and watt rating of heaters can be varied within wide limits by choice of type and diameter of wire and the diameter of the helix into which the wire is wound.

Commonly, heaters are made with electrical voltage ratings to match the power supply of voltages commercially available. These voltages are nominally 120v, 240v and 480v and in some industries, 575v and 600v. Newer network systems of the three phase, four wire variety deliver 120v and 208v. In some sections of the country these voltages have been raised to 240v and 416v. Higher voltages bring economy in use of copper and heaters must be made available for them.

Why Metal-Sheath?

All of us are familiar with the old-fashioned electric bathroom heater in which a coiled helix of resistor wire is wound on a tapered, screw base, ceramic block and mounted in a hemispherical reflector.

In the advanced metal sheath design, the resistor wire is immobilized in an insulating material which separates it from the metal sheath and supports the resistor wire in an electrically isolated condition. The insulating material, usually magnesium oxide, in order to be effective, must be highly compacted so that it combines the properties of a good electrical insulator and those of a good thermal conductor.

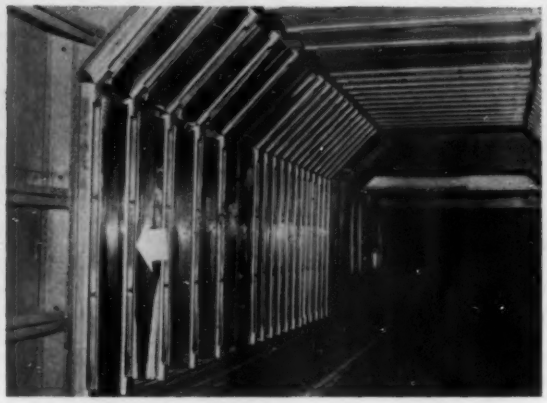
These two properties must be realized, for if they are not, either the wire will come into contact with the sheath, creating an unsafe electrical condition, or the temperature gradient between the wire and the sheath will be too high to make a heater of adequate life.

Apart from the materials selected, several different forms of metal sheath heaters are available in standard and special sizes and electrical ratings.

Strip heaters, commonly made with a mounting tab at each end, may be bent lengthwise and curved laterally in order to fit various surface shapes. A variation of the strip heater is the ring and disc heater. The strip heater is available, ⅜-in. thick, in several widths and with a maximum length of 96 in. When a chrome steel

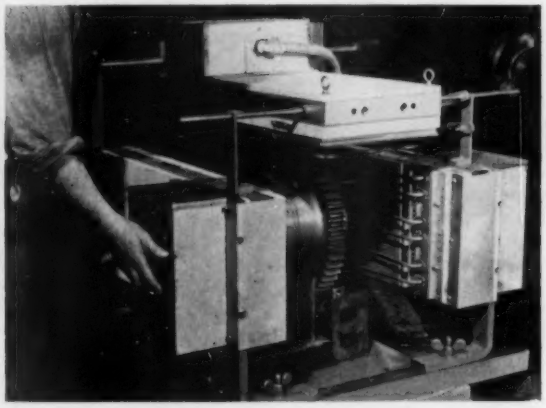
Here, Some Examples Demonstrate How Metal Sheath Heaters Can Be Applied in

TWENTY-FOUR immersion heaters with a total of 576 kw, caps of some of which are seen along the bottom of the generator, generate steam in a 72-ft long, 8-ft diam accumulator. The tubular heating elements are bent into hairpin shapes and the terminal ends welded into drilled flanges. The accumulator is continually energized and steam is used throughout each 8-hr working day.



THIS 30-ft long touch-up oven in an automobile assembly plant contains 85 heaters with total capacity of 164.9 kw. For rapid preheating of automobile parts, 60 heaters were mounted on 12-in. centers in the first section of the oven, while the remaining section, containing 25 heaters, serves as a holding zone. Accurate temperatures are obtained by use of separate input controllers for each section. Designed to operate at 18 fpm, the conveyor in this touch-up oven operates at 21 fpm, drying all colors with equal speed.

LOSS DUE to bottle breakage when filled with hot liquid, ran as high as 32 per cent in one fruit juice bottling plant. Utilizing the ability of far-infrared radiant heat, which has a predominating wave length of about 3 microns, to heat optically transparent materials, the company installed six, radiant heaters (arrow) on each side of the bottle conveyor to preheat the bottles. Breakage was eliminated and there was a marked reduction in shelf spoilage due to contamination.



FOR PREHEATING gears before shrink fitting onto shafts in this shop, radiant panels were mounted on a dolly so that the heat could be brought to the work. The heaters raise the temperature of the gears to 300 F in 10 min. Formerly, the gears were heated in an oil bath, with resulting long heat-up time, cleaning problems and fire hazard.

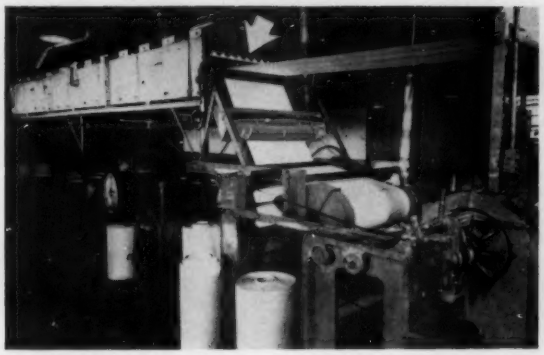
sheath is used, operating temperatures can be as high as 1200 F. Strips and rings are usually clamped to surfaces which it is desired to heat; however, they can be secured between two halves of a platen which is to be heated.

One of the early uses of the strip heater was in crane cabs, where they solved the problem of operators holding the motor rheostats on the first notch in order to heat the cab during cold weather. Since the motor starting rheostats are not made for this kind of use, burn outs were frequent. Installation of strip heaters made it no longer desirable to use the rheostat.

For heating air, fin strips can be used. A fin added to the strip increases its area and makes it easier to transfer heat to air or other gases. Fin strips are built into a variety of physical assemblies for use in ducts or ovens.

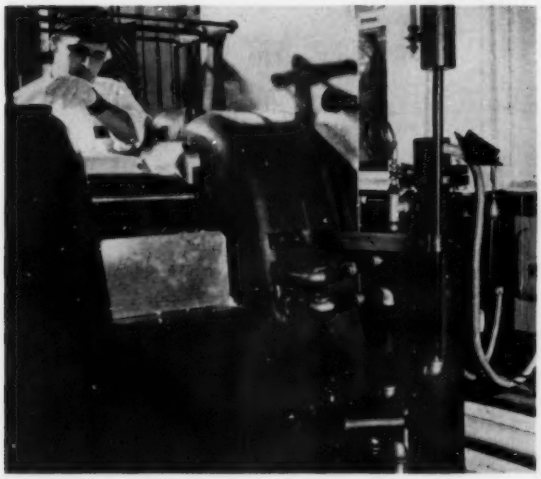
Perhaps the most versatile of metal sheath electric heaters is the tubular heating element. This straight element type can be bent and coiled into a variety of shapes to fit specific uses. While the section is usually heart shaped in its final form, it can be made with a triangular design presenting a flat surface which can be bolted to objects requiring heat. In the heart shaped form it can be clamped into

A Variety of Installations

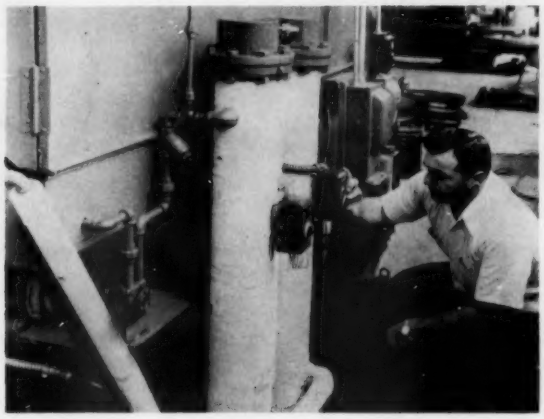


BECAUSE far-infrared heat is "color-blind"—it has the ability to heat all colors with almost equal speed—printed wall paper is dried at one mill 75 per cent faster with 50-kw radiant heaters (arrow) than with the 62-kw lamps previously used. It is dried at 87 fpm instead of a rate of 50 rpm formerly obtained.

A CONVEYORIZED oven, 18-ft long, equipped with radiant heaters is used in one plant for making metal parts. Total capacity is 57.6 kw with a time cycle of 10 min at 350 F. The cycle is 40 per cent faster than that specified for the job. Ceiling mounting of the ovens saved floor space and by angling the heaters on the oven wall, (arrow) it was possible to use standard length heaters.



BY REPLACING high pressure steam with electrically heated oil, a New York company eliminated an operating and maintenance problem in its plant. A plastic blending mill was formerly heated to 450 F by steam. The steam was replaced by oil, circulated by a pump and heated by a 15 kw circulation heater. Automatic temperature control makes it possible to dial the temperature for each operation.



PRECISE control of the temperature of the wax is essential in obtaining the correct thickness of wax coating on fiber shipping drums. In this plant, two electric circulation heaters, equipped with thermostats and using oil as the transfer medium, accurately control the temperature in the tank containing the liquid wax.

grooves of similar shape when this is desirable. Various sheath materials are available to handle the different temperature ranges and to combat chemical environment.

Tubular heaters of adequate diameter may be made in voltage ratings to 480v and many different types of terminal construction are available for various operating conditions. Hermetically sealed terminals can be applied to the tubular element permitting it to be used in an environment which would otherwise produce short life.

The cartridge element can fit drilled holes of the same nominal diameter in platens, dies, molds, etc. When heated, the cartridge swells slightly, thus making good contact with the wall of the hole and, therefore, producing low thermal gradient.

Sheath temperatures up to 1200 F may be developed with stainless steel sheaths, while brass is available for use with temperatures up to 750 F and nickel-silver for temperatures up to 1000 F.

In general we find two different types of controls popular in metal sheath electric heating applications. One is the straight thermostat, of which there are many varieties, which will

(Continued on page 176)

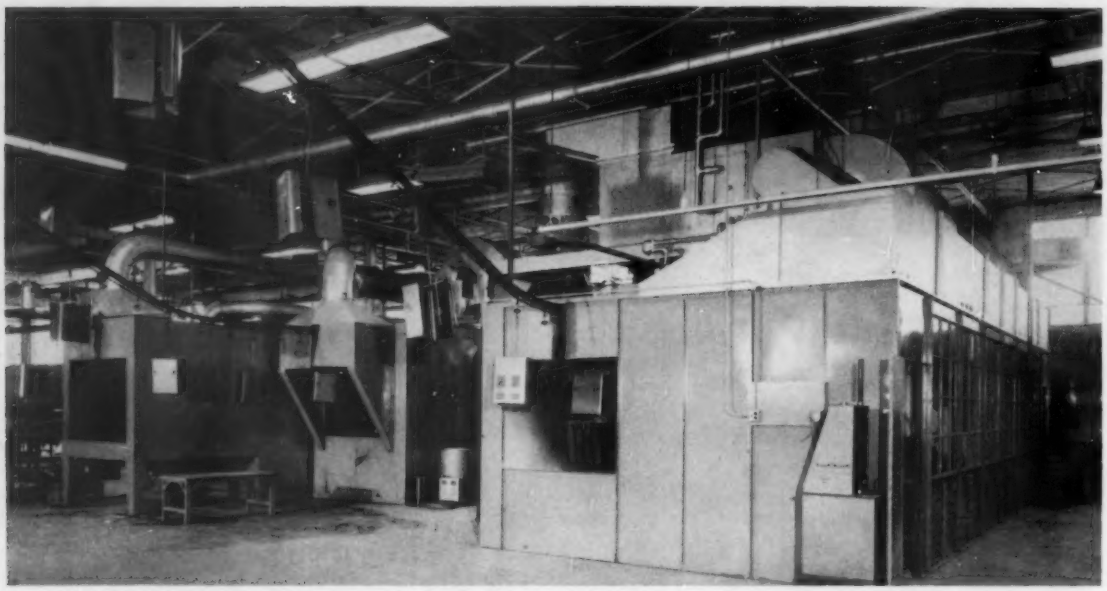


Fig. 1. At extreme left is entrance to washing-rinsing unit. Next to it is the exit from the dryoff oven. At this point, cabinets are conveyed for a 10-minute cooling cycle before entering spray booth, right, where base coat is applied

TV Cabinet Finishing at Raytheon

Special Engineering Features Were Designed into System

By STANLEY RENDELL, Factory Engineering Manager, Raytheon Manufacturing Co.

SEVERAL UNIQUE features designed to reduce heating costs and all but eliminate the problem of contamination have been incorporated into the semi-automated television cabinet finishing line at our new plant in Chicago.

Metal cabinets are degreased, dried, cooled, and coated while traveling along a two-section, 1500 ft monorail conveyor system, fitted with 50 lb capacity hangars that are spaced 20 in. apart. The conveyor, manufactured by the Rapids-Standard Co., is manually fed from a series of dead rollers that carry 20 gage steel plates through shearing, blanking, bending, and welding operations which convert the stock to proper shape.

First finishing operation is to clean the cabinets and prepare them for painting. This task is accomplished by a three-stage washing-rinsing unit. In the first stage, the cabinets are sprayed by an inhibited phosphoric acid solution. The solution removes shop soils and oil in addition to depositing a phosphate coating that inhibits rust and helps to improve paint adhesion later on.

Second stage consists of a clear water rinse; third involves running the cabinets through a chromic acid spray that neutralizes the surface and provides a slight etch that further improves the cabinet's ability to hold paint.

In all three stages, the solutions are maintained at temperatures ranging from 165 to 180 F. Heat is supplied by premix gas burners firing into large-diameter tubes built inside the tanks that store the solutions. In each stage, the spray is applied through V-jet nozzles installed along the top, bottom, and sides of the washer housing. The conveyor carrying the cabinets moves at right angles to the direction of the sprays. A 450-gpm pump, driven by a 7½-hp motor, supplies the first stage, while 200-gpm pumps, connected to 3-hp motors, perform this function in the second and third stages.

Cabinets remain one minute in the first stage, and 30 seconds in each of the others. The whole washing and rinsing operation, including drain time between stages, takes a little over five minutes. The washing-rinsing unit measures 53 ft long, 9½ ft high and 9 ft wide.

The four special design features incorporated into the washing-rinsing unit which provide substantial benefits are:

1. Products of combustion from the premix burners that heat the washer tanks are reused. Instead of being vented immediately to the outside, they are piped into the dryoff oven (next stage in the finishing operation), thereby substantially reducing the amount of heat required by the oven.

2. Between the three stages of the cleaning operation, cabinets spend 45 seconds draining off. The drain areas, which have sloped collection troughs, are 9 ft long. This comparatively long time and distance interval permits the cabinets to drain completely before entering the next stage. The trough slope was specially engineered so that the chance of solution contamination would be reduced to a minimum.

3. One or more sheet metal silhouettes are located between each stage and each drain area. Permitting just enough clearance for easy passage of cabinets and hangars, these baffles are another check on the contamination threat; they eliminate the possibility of spray nozzles in one stage shooting fluid out in such a way that it will be carried into another stage.

4. The bottom of each storage tank is sloped, permitting fluids to be drained quickly when the tanks have to be cleaned. This maintenance is performed once a month. A perforated flush pipe, hooked up to the plant water supply line, is installed in each tank. The pipe permits dirt deposited on the floor of the tank to be washed out easily, and eliminates the need of a hand hose. As a result, tanks can be cleaned in a fraction of the time normally required for this job with older units.

In the dryoff oven, cabinets are subjected to temperatures ranging from 250 to 300 F. We thought we would need about 100 degrees more heat in this oven, but it wasn't necessary because we are handling a higher-than-average volume of air. Here is how it works:

The rate at which moisture is removed from the cabinet surface is determined by two factors: the temperature, and the volume and velocity of air flowing over the surface. If the velocity of the air flow is increased, the speed of moisture-stripping is also increased. Thus, within limits, temperature requirements and heating cost can be reduced with high air velocities. Essentially, this is what we have done. We have saved on the heat bill by installing an extra-large blowoff fan—providing 14,000 cfm at 6 in. static pressure. The fan is powered by a 20-hp motor.

The dryoff oven, which is 40 ft long, consists of two 6 ft blowoff plenums at either end and a space in between that permits proper drying time for the cabinets as they are moved along by the conveyor. An important feature of the oven design (and the design of the other equipment, too) is that it has enough length to handle even higher conveyor speeds if and when we decide to raise output. Oven walls are 4 in. thick and consist of mineral wool insulation covered on each side by 20 gage steel panels. The air needed to dry the cabinets flows through high-velocity nozzles installed in the top, bottom and sides of the oven chamber.

Cabinets cool down to 100 F while traveling from the oven to the spray booth, the next step in the finishing operation. The trip takes about 10 minutes.

The spray booth is 42 ft long and 9 ft high. Workmen stand on a metal grating rather than the conventional concrete floor, and the overspray collection tank extends under this grating. This arrangement reduces the amount of overspray underfoot to a minimum, and provides two big advantages: first, the housekeeping chore has been reduced; second, since the overspray is both slippery and tacky, the accident hazard is materially lessened.

Most of the spray booth wall is composed of glazed sash: the window section measures 5 ft 6 in. high and 30 ft long. Using all this glass not only makes working conditions more pleasant for the painters inside—since they don't have to look at solid walls all day long—but the windows also make it easy for the finishing department foreman to check the operations from the outside.

The booth is equipped to handle several different kinds of finishes. Some TV cabinets get a blond or mahogany base coat; later on, these units will be run through a patented graining process that gives them a simulated-hardwood finish. The other cabinets are enameled in one of nine colors: charcoal, sea mist green, brown, gold, ebony, claret, puritan gray, or topaz.

The booth is equipped with 5-gal portable pressure tanks. Since a variety of coating materials are required, we did not install central dispensing equipment. Spray guns and tanks in use were manufactured by Binks and Grayco.

The booth includes a unique rear-wall curtain. The curtain is supported by three rows of vertical metal baffles running, picket-fence fashion, the length of the booth. Each row is offset slightly from the others. The water flowing down these baffles, instead of forming a solid curtain, is split up into sections. The baffle arrangement forces the paint-laden air to follow a rather tortuous route through the spray, which increases the scrubbing efficiency. Water flows down the baffles at the rate of 60 gpm per lineal foot of curtain.

Two air supply systems supply a total of 56,000 cfm to the booth and adjoining structures. Before being used, the air passes through a series of cleanable metal filters that remove impurities, then over fin-type radiator coils capable of raising the air temperature to a maximum of 70 F when the input (outside) temperature is as low as —10 F.

Most of this air volume—42,000 cfm — passes into the spray booth through filtered openings in the ceiling. After circulating through the enclosure, this air is sucked through the flood curtain to remove the paint accumulated on its trip, and then is dispersed to the outside. Although 42,000 cfm are blown in, only 39,000 cfm are exhausted through the curtain. This differential builds up a slight static pressure in the spray booth which, in effect, keeps outside dust from coming in through doors or conveyor openings.

(Continued on page 180)

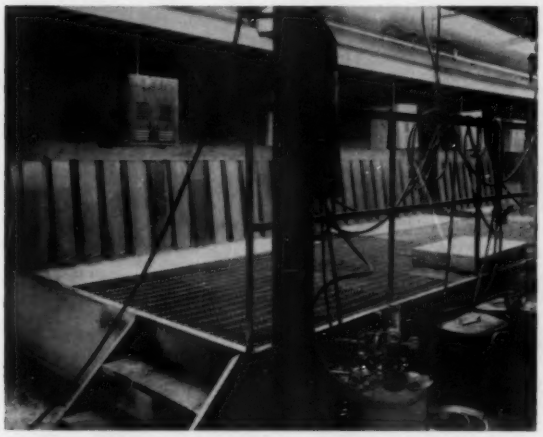


Fig. 2. Interior of spray booth features metal grating, which reduces housekeeping. Note the segmented flood curtain

Fig. 3. Elevated bake-oven, behind railing, cuts heating cost, provides space for paint storage. Flash-off tunnel is at left

Fig. 1. Right: Cross section of building illustrates how this type of construction eliminated columns on first floor

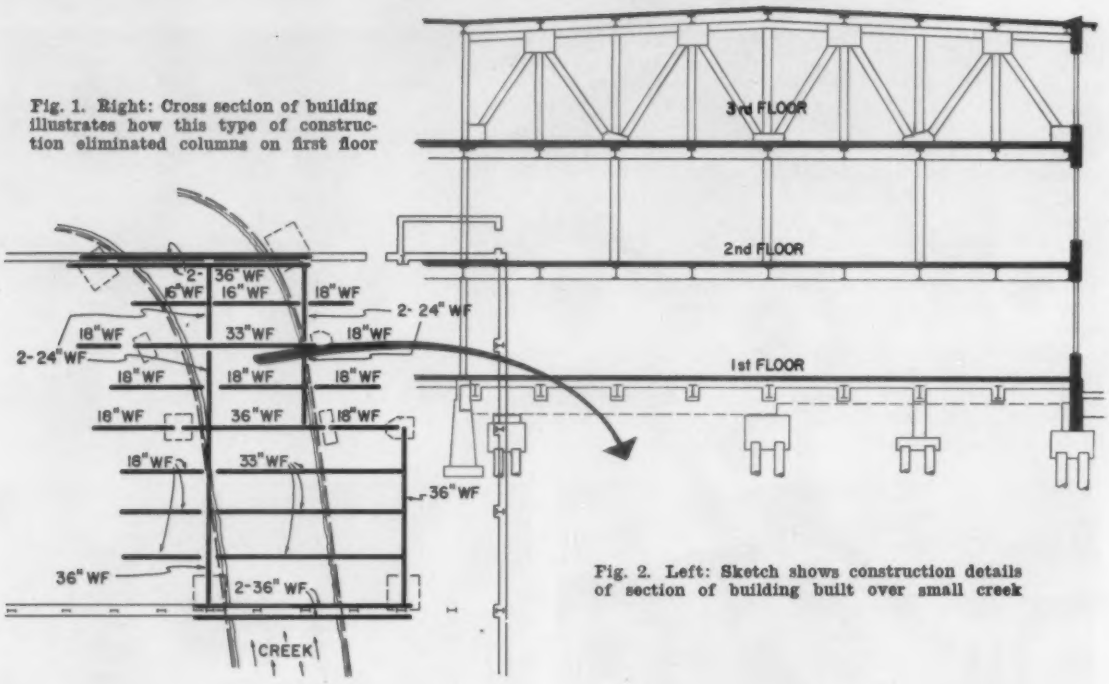


Fig. 2. Left: Sketch shows construction details of section of building built over small creek

Look—No Columns!

Suspended Floor Gives Plant Open Space It Needed

By JAMES G. ARMSTEAD, Maintenance Engineer, F. C. Huyck & Sons, Rensselaer, N. Y.

WHAT WE NEEDED when enlarging and rearranging the plant was an area unobstructed by columns. The main reason for this was to permit us to lay the felts flat on the floor for measuring.

Because of the plant's location, it was not possible to build a single story building for this area. We asked the advice of several engineering firms familiar with industrial construction. This resulted in the design and construction of a building following the pattern indicated in the sketch.

This sketch shows a typical cross section of the building. The expanse, at first floor level, is 70 ft wide. The building is 160 ft long.

The first floor is of concrete slab construction on piles. One interesting fact is that a portion of the building is built over a small creek which runs into the Hudson River. Construction details of this section of the building over the creek are shown in Fig. 2.

Second floor is of concrete on steel construction and is supported by vertical members which, in turn, are suspended from trusses that are built into the third floor. Third floor and roof are of wood and steel construction.

By literally "hanging" the second floor from the roof trusses, we were able to accomplish the following: (1) An unobstructed first floor area, Fig. 3; (2) A normal mill construction area on the second floor with columns of conventional spacing; and (3) A third floor with trusses running in one direction on 20-ft centers.

Since the area on the third floor is used to store wool fiber in bales and in storage bins, we are able to get effective use of this area without any interference from the trusses.

Several years of "living" in this building have proven it to be very satisfactory for our requirements.

The design of this building and supervision of construction was the work of Rice & Youngson, Architects and Engineers, New York City, N. Y.

Fig. 3. Here is a view of the first floor. Without columns to hamper their operations, the workers have a lot of room to lay the large felts flat for measuring

Low Cost Freezer Room at Welch's

Free-Standing Walls Speed Erection

Fig. 2. One of outer walls of freezer. Walls contained two layers of cellular glass blocks on building's perimeter

WHEN THE RAPIDLY expanding operations of The Welch Grape Juice Company demanded additional freezer and cooler space, company engineers designed a new type of low temperature enclosure which is not only quicker to erect but also less expensive.

These freezers and coolers at the Brocton and Westfield, N. Y. plants are constructed of blocks of cellular glass insulation. The walls are erected,

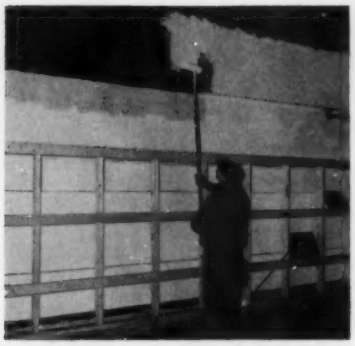


Fig. 1. A vinyl emulsion finish was applied over interior walls of room

in most cases, as free standing walls of the insulation alone. They are merely painted with a vinyl emulsion finish. A wooden bumper rail is erected on the inside of the room.

Floors of the rooms are constructed on grade, and consist of 3-in. sub-slab, insulation (6 in. on freezer floors; 5 in. on tank rooms) followed by the wearing slab. Walls are two layers of 3-in. blocks. Ceilings are generally of pan construction and utilize 8 in. of insulation when they constitute the outside building roof and 6 in. when on the interior of a building. One of the freezer rooms at the Brocton plant utilizes T-iron ceiling construction.

In most cases the freezer and cooler rooms are constructed in the interior of an existing building. However, the recently constructed concentrate freezer room at the Brocton plant was built out of doors as an addition to an existing building.

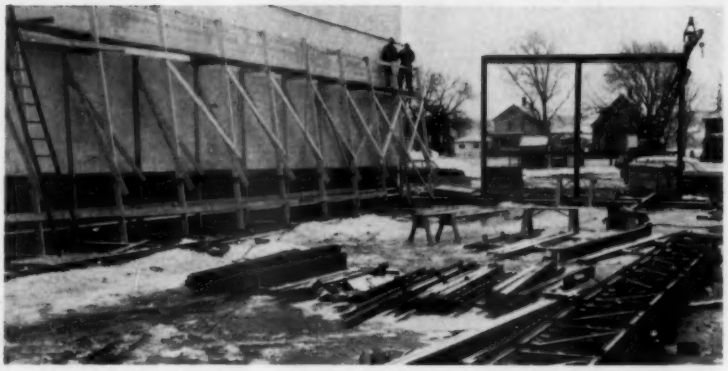


Fig. 3. During process of construction the floor, made of cellular glass insulation, was subjected to freezing and warming weather without suffering damage

Essentially, building the freezer walls consisted simply of erecting two layers of 3-in. blocks. Since the insulation is composed of hermetically sealed glass cells, no vapor barrier is required. One side of the structure is against an existing building and the others are self-supporting walls of insulation. A galvanized steel panel wall protects against pilferage and weather.

The freezer, used for freezing grape concentrate, is divided down its center by another free-standing cellular glass wall. This arrangement allows one half to be used as a freezer at controlled low temperatures while concentrate is shipped from the other side. The situation is then reversed, shipping from the just-frozen stock and then lowering the temperature for freezing in the other side.

A. J. Monta, Welch's chief engineer, calculates that the use of the new tech-

(Continued on page 174)

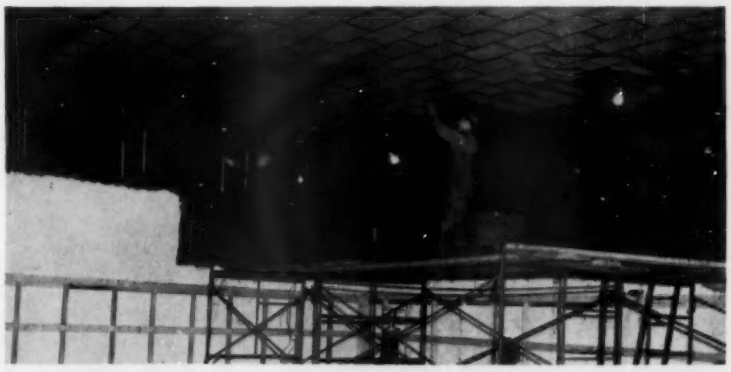


Fig. 4. Concentrate freezer room at Welch's plant features free-standing walls

Fig. 1. Dolly-barrel hook-up system is utter simplicity

Fig. 2. Dust is collected via these flexible rubber tubes

Barrel Trains Save $2500 Monthly

Workers Breathe Easier in Low-Dust Atmosphere

AT LOS ANGELES' Gladding, McBean & Co. they've got a new refrain for a hit tune. Sixteen tons? No, 84 tons. And $2500 salvaged monthly.

Eighty four tons of tile-body scrap, once consigned to the scrap dock, are being salvaged, repulverized, reused in the manufacture of wall tile. The savings: $2500 monthly during peak production, never less than $1500.

Behind it all is plant engineering's inplant streamliner "barrel train" eight barrels long. Additionally, some five collection systems maximize reuse of ceramic dusts.

But the barrel train deserves first scrutiny. Gladding, McBean's problem: how, monthly, to turn 84 tons of scrap tile to useful purpose. By its old system, two maintenance men were assigned to hand-truck scrap barrels to the dock. From there, the company paid to have the stuff hauled away. But the plant engineering staff, figuring the loss, came up with the barrel-train idea.

System components: 70 special barrel dollies, their steel frames fitted with rubber-tired casters, each frame designed to hook onto the next; an automatic barrel-dumper, push-button controlled; four, 3000-lb scrap bins.

Dolly design: Final design, as worked out by Los Angeles' Colson Equipment and Supply Co., resulted in a simple, yet sturdy barrel frame. Barrels fit into the frames. Caster wheels make even loaded barrels (they hold up to 300 lb of scrap apiece) roll easily. Hook-device, one at front and rear of the dolly, is drop-pin type. Beneath each coupler is a second fitting . . . this, so that a man without stooping, can hook a manual tow-rod into the train's first barrel.

Fig. 3. Dumper hoisting barrel into bin from barrel train

Fig. 4. Fork lift hoists portable tile scrap bin for dumping

As many as eight loaded barrels can be hooked into a train. And, although their total load may approximate 2000 lb, one man finds little trouble pulling them.

One big advantage of the dollies is that they're highly mobile, thus can be stashed under conveyors, shoved into corners, placed almost anywhere . . . yet can be easily rolled out when a train is being made up.

Dumper: A maintenance man pulls his barrel train to a Type C Cesco Model D-7 dumper. One at a time he uncouples the barrels, pushes them onto the dumper elevator, clamps them into a place with a chain. The dumper lifts each barrel, dumps it automatically into a scrap bin. This bin, in turn, is designed for fork-lift transport. When bin is filled, it's lifted away from the dumper, placed on a special stand. Bin then gravity-feeds onto a conveyor belt which carries scrap tile body to a pulverizer . . . thence back into tile production.

In the body preparation department there's a secondary manufacturing process, the mixing of body materials for trim tile. There are two different bodies. And two different types of dust are collected by a single dust collector working at 4110 cfm (a 3:1 ratio).

Along one line, dry mix (talc and clay) is dumped into a screw conveyor, sifted through a gyratory unit, and mixed. Hoods collect dust along the entire line, feed it to one hopper of the collector. Proper engineering has made the initial bag-opening and dumping job about as dust-free as possible.

Along the second line another tile body mixture is prepared. The mixture is tinted green via a vegetable coloring which disappears when tiles are fired. (The coloring's purpose is solely for identification of the mix during processing). "Green" dust is likewise collected along its mixing route . . . and is sucked into the dust collector's second hopper (separated from its twin by a baffle). Again, the "green" dust is salvaged, returned periodically to the mixer.

Fig. 5. Plant engineering rigged these below-table dust collector grids. This is, essentially, a closed ducting system which leads to an outdoor dust collector

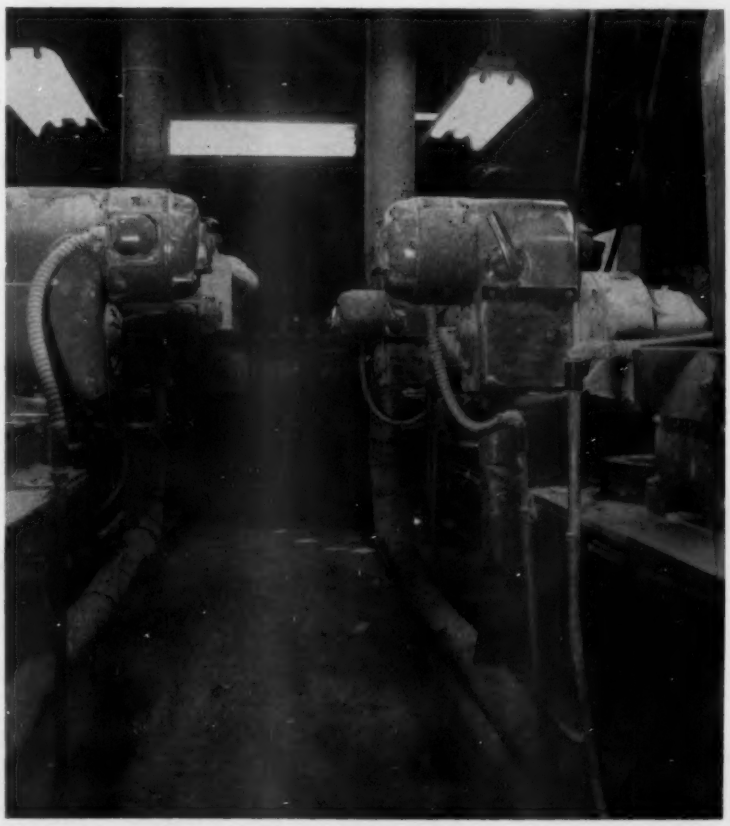


Fig. 6. This is a six-barrel train. There are seventy barrels and dollies like these saving thousands of dollars every year at Gladding, McBean & Co. plant

Not only is dust kept to a minimum, but so is waste.

In the decorative tile department, eight in-line presses and their fettling tables (where tile, freshly formed, is sanded) are monitored by a system of ducts and hoods, these routing to a dual-bin dust collector working at 9864 cfm, its air-to-cloth ratio 3:1. Collector's big advantage is that it works dry, thus makes salvageable dust from the pressing department. Collected dust is returned to the body prep department where it's processed.

But the larger factor here is good housekeeping in a department where girls can work maskless, thanks to efficient dust collection.

As every ceramic manufacturer knows, the pressing-fettling table set-up is forever being revamped, to squeeze from it maximum efficiency. The company has been experimenting with a number of duct, hood, and brush systems. Among the most efficient to date appears to be a 6-in. flexible rubber tubing which connects collecting hoods.

One hood is attached to the top part (male section) of the tile die, actually moving with it, gathering dust created during pressing. A second hood collects from rotating brushes which clean tile after it has passed through sanding strips. Other hoods are positioned over each girl's station to minimize dust in this area. At some stations manual brushing is used, the operator pulling tiles over a stationary brush, the entire process monitored by small portable hoods. Yet all tables feed to the central dust collector.

Tile-sizing via special grinding machines (five of them in the wall tile department) has been perfected to a point where the manufacturer advertises one brand of tile as being "micro-sized." This means that two of the tile's adjacent-edges are ground with micrometer accuracy. Result: tiles fit snugly, make the setter's job easier.

Each of the five grinders work 90 to 120 tiles a minute. Primarily, dust and chips are collected from two points on each machine: (1) at the grinders; (2) at the brushes. All ducting is under-table. Except at the brushes where hoods are used, the system is essentially closed. Collection here, quite aside from standpoints of health and good housekeeping, is for safety's sake. For grinding produces small chips. Were they not speedily sucked into the collection system, they could prove dangerous (grinding velocity is high.)

Dust and chips are carried to another dust collector operating at 4932 cfm, with a 3:1 ratio. Hoppers are tapped, the dust bagged and routed to the dinnerware plant, there to be re-milled and compounded into earthernware body mix.

Savings are considerable. More important, dust and chip collection means safety, efficiency and orderliness in the grinding room.

To meet demand for expanding production, tile presses have been set up in a building formerly devoted to another product. The new set-up uses 1800-lb capacity bins fork-lifted from the tile body department and set above a screw conveyor, which feeds body mix to the tile presses. Again, a dust collector monitors the entire process, from tile pressing, through sanding and brushing. This collector works at 2016 cfm.

Tile body, from the dust collector is reclaimed, returned and reprocessed.

Says engineer Don Ingersoll, "We waste nothing here. It doesn't take much scrap or dust to add up to big figures."

For Gladding, McBean, reuse of tile scrap alone currently adds up to $2500 monthly, a sizable figure in any ceramic plant.

"They don't have much of a family life."

Fig. 1. E. Z. Dosit stresses work simplification for the Cleveland Electric Illuminating Co. He is composed of charting symbols, "O" for operation, arrow for transportation, triangle for storage, "D" for delay, square for inspection

Work Simplification Cuts Hazards

Safety Is a Dividend From Method and Condition Improvement

By LILLIAN STEMP, Technical Reporter

THE LIST OF SAFETY improvements resulting from the application of work simplification principles to jobs, proves that work simplification training can be an important factor in promoting injury-free performance. And this applies whether you are presently operating with an organized safety program or without one. Often the improvements not only increase the safety factor of the operation, but also make it easier and more productive.

Work simplification training emphasizes safety in various ways. In making the step-by-step analysis or breakdown of jobs and in charting various operations, you learn to examine each step for any inherent hazards or dangers. Then when developing an improved method, you consider remedies for these hazards or dangers. An example would be the opening of clips which hold index cards in an addressograph frame. A machine operator at the Cleveland Electric Illuminating Company found the operation was both difficult and tedious when he used a knife to open these clips.

In making a work simplification study of the job, he recognized the hazard involved in using the knife and looked for a safer way. He developed a portable device by utilizing an obsolete stamping machine and adding three die prongs and a lever to it. The device not only eliminates the accident hazard, but also opens the clips and releases the index cards in less time than formerly required.

Safety is emphasized when relating the principles of motion economy to the various operations, particularly in respect to the "arrangement of the work place." The check list used by Allan H. Mogensen in his work simplification training conferences include these specific points concerning the arrangement of the work place: (1) provide definite and fixed places for tools and materials; (2) locate tools, materials and controls around the work place and as close in front of you as possible; (3) use gravity feed bins and containers to deliver the material as close to the point of assembly as possible; (4) use drop deliveries whenever possible; (5) locate materials and tools to permit the best motion sequence; (6) provide adequate illumination; (7) arrange heights of work place and chair to provide alternate sitting and standing positions; (8) provide a proper chair of proper height with back rest.

The application of a number of these points is noted in a number of ensuing cases. At the Cleveland Electric Illuminating Company facilities a "definite and fixed place for tools and materials" was provided when mechanic R. F. Mathews proposed brackets for holding front end adjustment tools be installed on the wall of a repair shop. This eliminated walking approximately 400 ft to the toolroom when the tools were needed, reduced fatigue, and lessened the chances of using makeshift tools when the men were in a hurry.

The first part of point two dealing

with tool location is illustrated in Fig. 2. This shows a work table located near a press at the Reynolds and Reynolds Co. facilities in Dayton, Ohio. A roll of tympan paper has been mounted on the top of the table with the paper passing underneath a steel straight edge. The length gage down the side of the table allows the pressman to pull out to the desired length the sheet of paper that he wishes to use and then cut it off against the steel edge.

Underneath the table, on a shelf, are additional sheets of packing paper he will use when packing the press. There are many pressrooms where rolls of tympan paper are located some distance away from presses, and often placed on the floor where it is possible for the roll to be knocked over and cause a foot injury. Also, lack of a length gage often causes undue waste of the paper.

When Frank J. Glavan, of the Cleveland Electric Illuminating Co. (CEICO) suggested an easier and safer method for receiving and handling pipe-covering by using mechanized handling equipment and a wooden carrier cradle, this not only reduced the travel distance, multiple trips, and the need for hand trucks, but it also typifies what can be done with point three mentioned previously.

Carton Banding

Using drop deliveries made banding cartons easier and safer for Copifyer Lithograph Corporation employees. In the old method of handling, a separate operation was required for packing and banding, another for turning and banding—then two men lifted the carton to the floor. Now a rotating turn table turns the cartons and a slide takes them to the floor. Only one man is required to do this work and he can do it much easier.

Work simplification training definitely increases the safety factor for personnel working in plants that do not have formal safety programs, as well as those where safety programs have been in effect for some time. Safety often results as a by-product of many of the work simplification proposals. For example, looking for an easier way to level material being cut with a power saw resulted in the utilization of an automotive jack. Time was saved, formerly required to position boxes and blocks for makeshift leveling; safety and working conditions also improved.

A search for the easier way to cut steel winch cable brought about greater safety at CEICO. Formerly a chisel or welding torch was necessary for the cutting of the cable. Now a cutter, which works on the same principle as a guillotine, makes the job easier and safer.

Fig. 2. Roll rack and length gage are located conveniently on a work bench

Also, a method for expediting the handling and storage of coal pulverizing mill bull rings was sought at CEICO. A work simplification proposal was developed which called for the insertion of ¾-in. eyebolts at either side of the rings. Handling improved and so did safety conditions. Bolts allow the ring to be lifted horizontally, eliminating dangerous sway.

E. Z. Dosit is CEICO's character symbol for work simplification. He wears gloves to emphasize safety. One of the employees uses E. Z. Dosit to carry a safety message for all jobs which are turned in for future scheduling and completion. He uses a work simplification ruler which has cutouts of the process chart symbols. Drawing these symbols together, he forms the character, E. Z. Dosit, and then pencils in a reminder, such as "Safety is your first job today", as a sign which E. Z. Dosit holds.

At Copifyer Lithograph Corporation, while the company was replacing an old press with a new one, the men found that the "run" button on the new press was in the same position as the "inch" button on the old press. This caused confusion in operating because when helpers or press operators shifted back and forth from the old to the new press, sometimes they would hit the "run" button by mistake when they really wanted to "inch" the press. After several near accidents and a work simplification approach to the problem, safety covers, 1/16 in. thick circular disks, were installed over the "run" buttons on all the new presses. These disks have to be pushed aside in order to press the run button.

Injuries due to hitting wrong buttons are common enough to have warranted national study of the problem through the American Standards Association. A draft of a proposed code to standardize push button controls and signalling devices on printing presses has already been completed by a committee assigned to this project.

Perhaps the most noticeable improvement in safety performance because of work simplification is in the area of materials handling. Work simplification proposals have eliminated many backbreaking operations, saved steps in transportation of materials and established control and accessibility in storage.

Splinter Trouble

After 19 employees reported to the First Aid room of the Standard Register Co. for the same reason, a work simplification team went to work. It sought to design a program which

Fig. 3. Steps were taken at one plant to find corrective procedures for the handling of wooden trays after First Aid had 19 splinter cases in one month

Fig. 4. Scrap paper jammed inside the cyclone; worker breaking up this jam fell three stories to a baling room

Fig. 5. An access door was cut in the duct leaving the unit. Worker does not reach through cyclone to clear jam

would get damaged trays promptly out of circulation and facilitate repair work on them.

Marked storage areas were arranged, a new kind of truck was utilized for transporting and storing the trays. A repair schedule was developed so that the maintenance repair man could handle the trays more efficiently and with less chasing around to see that the damaged ones were taken out of circulation.

At the 1953 Conference on Utilizing Human Resources held at the Carnegie Institute of Technology, a number of material handling examples, resulting from work simplification in the graphic arts industry, were presented.

One company that does quality work which must be inspected, sheet by sheet, discovered that as long as a skid of paper was piled high enough to be level with the inspection table they had no trouble. However, when the paper on the skid got too low, it required a lot of stooping and lifting for the inspection, which was fatiguing and also took a great deal of time. They solved the problem by putting the skid on a hydraulic lift that keeps the pile level with the inspecting table at all times.

In another case that was cited, a tier of shelves mounted on casters brings small quantities of different stocks for short run jobs to the press. For example, all the stock required for a day's production on a vertical press could be brought at once. This eliminated delays while waiting for stock, and it also eliminated travel back and forth to get small quantities of stock for short run jobs.

At CEICO, construction of a special pallet which extends approximately 18 inches beyond the side of the fork-lift truck permits long materials to be carried through doorways without unloading. Previously, because the material could not be loaded parallel to the truck, it was necessary to unload the material to a dolly, roll the dolly through the doorway, and then reload the material on the truck. The special pallet eliminated the double handling and reduces fatigue.

Another back saver was the proposal to construct a steel box having a sloping bottom and a hinged door. The rubbish and scrap was formerly put into wheelbarrows and later shovelled into dump trucks. The new method allows the rubbish box to be picked up by a lift truck and dumped directly into the truck.

Employee Suggestion

Along with material handling, personal falls rate high in injury statistics. In many cases work simplification proposals have eliminated conditions which contribute to falling. For example, at CEICO, an employee's suggestion to cut off the smoke indicator pipe and make other minor changes to create a draft, kept the soot from accumulating on the smoke indicator lens. This means a man no longer has to climb a ladder at least once a day to clean the lens.

Cleaning out paper jams in a cyclone system in one Midwestern plant presented a hazard of falling. In one case, a man did fall three stories to the baling room. This procedure involved turning off the blower and cleaning out the the cyclone on the roof by climbing into the top and rummaging through the screen. See Fig. 4. The backed up scrap paper would also be cleaned out of the penthouse. The paper was put in gunny sacks and carried down three floors. This work sometimes included the handling of as many as 100 sacks. Paper would sometime drop out of sacks and be blown around the roof.

Under the new method, the following operations are involved: (1) turning off blower; (2) cleaning out cyclone by opening trap door in duct just inside the roof of building. Trap doors are accessible via catwalks; (3) cleaning backed-up scrap out of penthouse merely by hand feeding it into an exhaust duct newly added to the penthouse which carries this backed-up paper directly to the baler. See Fig. 5. No clean-up is necessary and the whole job can now be done in less than half the time it used to take just to clean up the roof.

Keeping work simplification participants informed as to new products available in the safety field will often suggest adaptations to their particular jobs. Generally this information is made available through bulletins.

When a CEICO employee learned about ready-made high visibility tape, he proposed that it be used instead of high visibility paint which was formerly applied. Applying the paint to small area of protruding objects was time consuming and tedious. Now the tape is put on small areas such as edges of switchboards, risers on steps, low bus work, and others, with the tendency to reduce the number of injuries which result from striking such objects.

Fig. 1. Books, pamphlets are listings of visual aids and sources, received in Plant Engineering's "quickie" film search

Visual Aids—

A "Gold Mine" of Training Help, if You Know Where to Dig

QUESTIONED on the subject by plant engineers in the Chicago Plant Engineers' Club, the editors of PLANT ENGINEERING have made a preliminary effort in evaluating the status of the visual aid—particularly movie and slide films—in industry. The situation, as presented by the Chicago plant engineers, is that film listings and their sources is information that is not to widely distributed. The plant engineers concerned were interested in using films as training aids in their plants, particularly in the maintenance departments, but they were too unfamiliar with published listings or catalogs available to assist them in selecting film programs.

On the assumption that the feeling was not restricted to those few men who had complained verbally, a questionnaire was sent to some 3000 PLANT ENGINEERING readers. With a response in the neighborhood of 15 per cent (good, considering the fact that the questionnaire was five pages long!), the survey definitely established that there is a demand for training films in industry.

In the interests of simplification, the questionnaire was constructed on the basis of eighteen job functions or responsibilities that are within the plant engineer's jurisdiction in plants throughout the country. For each of these areas of responsibility, the recipients of the questionnaire were asked to indicate the topics on which they had used training films, and the topics on which they could use such aids if they were available.

In the order in which they appeared on the questionnaire, these functions are: electrical distribution; illumination; communications; mechanical power transmission; refrigeration and air conditioning; piping and accessories; process and space heating; pumps; engines and prime movers; materials handling; construction and building maintenance; tools, welding, metallizing and special processes; paints and protective coatings; safety (fire, personnel and process); water supply and treatment of industrial wastes; lubrication; industrial fuels; and instruments, measurements and controls.

Of these, the questionnaire returns showed greatest interest in the following eight general categories: electrical distribution; mechanical power transmission; piping; pumps; lift truck segments of materials handling; paints; lubrication and instrumentation.

Each of the eighteen primary divisions of the questionnaire was broken down into several specific categories, to pinpoint trouble spots as accurately as possible. Of the 512 returns tabulated, electrical troubleshooting was

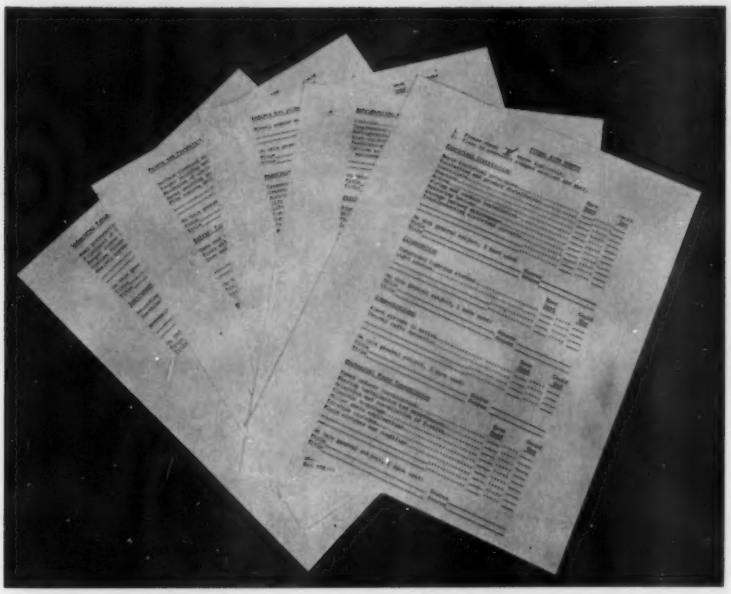


Fig. 2. Five-page questionnaire covered various phases of plant engineering

the "high interest" leader, with 371 requests for film coverage. Second, in the mechanical power transmission field, bearing installation and maintenance received 349 votes; in piping, pipe fitting practices received 330 votes, and in the pumps field, a film on shaft packing methods was requested by 312 recipients of the questionnaire.

Consideration of these four "front-runners" indicates that maintenance of plant equipment is of primary interest to plant engineers all over the country. For example, the interest in pump shaft packing could be interpreted as a measure of the pump maintenance required in industrial plants.

It also indicates a feeling among plant engineers that the basic operations in the maintenance of equipment should be reviewed for the personnel involved in such maintenance.

Reflecting the more strictly educational needs felt by the plant engineers questioned were the high responses on the categories of:

Basic electrical principles
Starters
Motors
Pump construction and operation
Theory of lubrication

Arbitrarily selecting 50 per cent, or 256 mentions as the minimum number for an interest indicator, subjects other than those already discussed qualify as training aids that are high on the list of preferred material: wiring and conduit installation; selection and installation of v-belts; impeller and shaft repairs on pumps; pump and drive alignment methods; care and operation of fire extinguishers and the operation and maintenance of recording instruments.

The "Have Used" column of the questionnaire produced some excellent information on the companies that are already engaged in the preparation and distribution of films for industry. Most frequently mentioned as producers and distributors were General

Fig. 3. Tabulating survey returns proved tedious but fruitful. Film preferences showed clear fields of reader interests

Electric, Westinghouse and General Motors. Naturally, the films are in the fields in which the companies are engaged — Westinghouse and General Electric in electrical distribution and apparatus, General Motors in bearing applications and lubrication problems.

With 121 individual films mentioned (at least two in all the categories except Communications and Materials Handling) considerable activity in the past is reflected in the availability of these films for industrial use. However, knowledge of this availability is obviously not widespread, and many plant engineers are unaware of the film services that could be of assistance in planning an in-plant training program.

It is interesting to note that only 10 of the total 121 films mentioned received multiple mentions in the order of four or more. Also worthy of note is the fact that of these 10 films, two dealt with electricity, two with piping and valves, two with fire and fire safety, and two with lubrication.

Sample reader comments, taken from the returned questionnaires, indicate a variety of opinion on the use and availability of visual aids in training. The following are examples:

"No training programs in process in the plant at this time, although we have used a film or two when setting up a new program, i. e. plant protection or lubrication."

"We have, in the past, been conducting training courses for maintenance and other workers, but have been unable to obtain much material in the way of visual aids. We have used movies and film strips distributed by manufacturers but found them to be more of an advertising nature than a training aid.

"We are still quite interested in obtaining films of this type and ask that you send us a list of available film as soon as you have such information."

"I am very much interested in visual training aids for maintenance but have never known where to get this information. We have never used training films and I would appreciate receiving a list of available films after the survey is completed."

"Your letter and questionnaire regarding visual aids is most needed in our field.

"Our men obtain their training by experience, but they lack the basic principles, and we take much for granted instead of training them."

"Up to the present time, I haven't given much thought to the use of films as an aid to our training programs. It sounds like it might be a good idea. Include me on your list of the interested, if you develop a list of available films."

Fig. 4. U. W. Brandt, left, of Wisconsin University Extension Division, showed Plant Engineering editor Andy Anderson around extensive film files maintained

"We have not been able to secure training films and are very interested in being able to do so."

"I have tried on several occasions to obtain such information. Have written to manufacturers requesting literature and films, in every case they stated that they do not have anything to offer."

"We are very much interested in the use of training films for our plant maintenance personnel, who number 135 hourly employees covering all crafts, skills and trades necessary in chemical manufacturing. Most of these men have picked up their know-how on the job over many years and require training not only to acquaint them with up-to-date techniques but also to eliminate poor practices which they have picked up."

"It seems to me that a good answer to your extensive questionnaire would be to send you copies of some of the lists of available films which we have used.

"No trouble has been experienced due to lack of material; in fact, there is so much available that we cannot use all of it."

Investigations by PLANT ENGINEERING's editors have turned up one excellent source of training aids—the universities. Letters to the University of Illinois, the University of Indiana, and a visit to the University of Wisconsin have produced listings of thousands of films, on hundreds of subjects. Many of these films are, of course, not of interest to the plant engineer as training aids for his personnel, but representative of the listings of interest are the following:

Electrical Work—Wiring
Drilling and Reaming Tools
Gages, Jigs and Fixtures
Gas Welding
Gears
Grinding and Filing Tools
Lathes and Boring Tools
Planing and Milling Machines
Principles of Lubrication
Working of Lumber
Machine and Hand Tools
Machine Shop Practices
Refrigeration
Soldering and Brazing

The U. S. Government, as might be expected, is the largest producer and supplier of films for training use. Their catalog, "U. S. Government

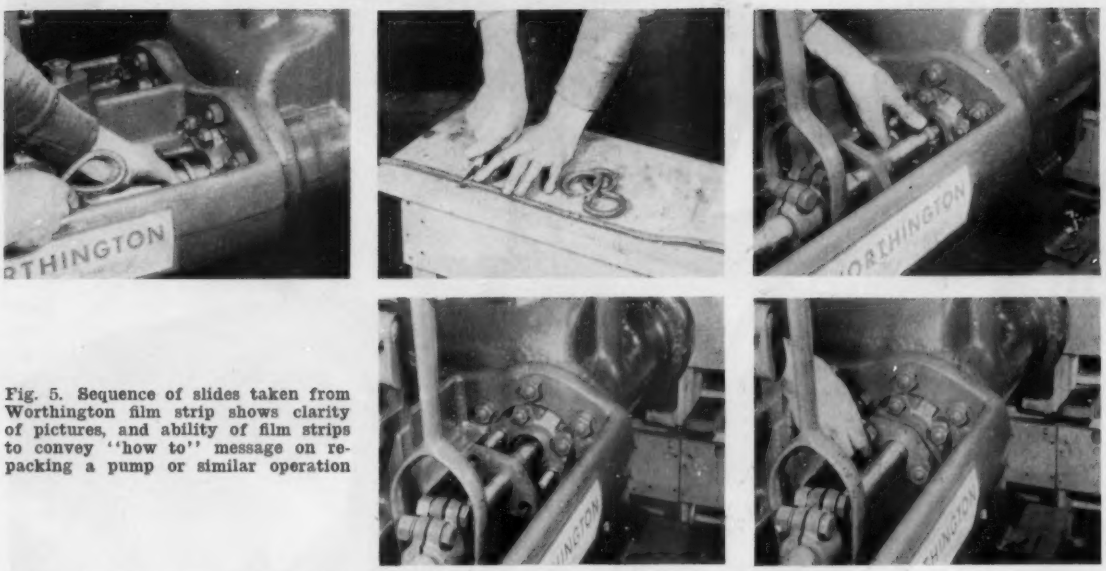


Fig. 5. Sequence of slides taken from Worthington film strip shows clarity of pictures, and ability of film strips to convey "how to" message on repacking a pump or similar operation

Films for Public Educational Use," while general in coverage, lists some excellent films for industrial training use. Also listed, by states, is at least one source of films for each state in the Union. With the exception of two states, Delaware and Rhode Island, this source is connected with the state educational function.

This catalog, which would be an invaluable aid in setting up a visual aid training program, is available from the Superintendent of Documents, U. S. Government Printing Office, Washington, D. C., for $1.75.

For service within your own state, a letter to the State University, Department of Audio-Visual Education, should produce a listing of the films which are available, a synopsis of each film, and its rental charges.

Otto J. Seidl

Plant Engineer With a Planned Film Program

Combustion Engineering's maintenance men get weekly film programs . . . Scheduled in advance . . . Shown in training room . . . Chosen by craft interests for group showing

PLANT ENGINEERING's study brought to light one plant engineer who has taken full advantage of the availability of visual aids.

Otto Seidl, Plant Engineer at the East Chicago, Indiana, plant of Combustion Engineering, Inc., has set up training schedules for the craftsmen in his employ, and reports that the programs are meeting with success.

After contacting the industrial plants in the East Chicago area, and finding a lack of films or information about them, Otto wrote to the University of Illinois and the University of Indiana, which were his local sources of training aids.

Both schools maintain Visual Education departments, and supplied catalogs of their current film library. From these catalogs, Otto chose films suitable for showing to his men, by crafts, and has set up tentative schedules for film programs that will extend through several weeks of training.

The film programs are offered weekly, and a training room has been set aside for the purpose of showing the films. Attendance at the showings is voluntary, and "lecture" approach is avoided. Often the movie is shown twice with a discussion between showings.

Typical of the programs which are being prepared at Combustion Engineering is the following, arranged for showing to the building tradesmen engaged in maintenance of the buildings on the plant site.

Training Films for Building Maintenance Craftsmen

	Source	Time	Producer		Charge
Concrete	Univ. Ill.	35	UC	University of California	$4.45
The Hand Plane	Univ. Ill.	12	TOM	Tompkins Films	1.85
Hand Sawing	Univ. Ill.	20	JH	The Jam Handy Org.	2.65
Hand Saws	Univ. Ill.	12	TOM	Tompkins Films	1.85
Ripping and Crosscutting	Univ. Ill.	19	UW	United World	1.50
ABC of Hand Tools (Part I and II)	Univ. Ill.	36	GM	General Motors	3.35
Claw Hammer and Nail Set	Univ. Ill.	11	TOM	Tompkins Films	2.00
Pliers and Screwdrivers	Univ. Ill.	15	PTC	Plumb Tool Co.	2.65
Plumb Tool: Chisel	Univ. Ill.	11	PTC	Plumb Tool Co.	1.85
Plumb Tool: Hammer	Univ. Ill.	10	PTC	Plumb Tool Co.	1.85
Repainting a Frame Building	Univ. Ind.	17	USOE	U.S. Office of Education	2.75

Fig. 1. Overall view of a typical steel belt conveyor as seen from the take-up end. Section of the belt beneath the loading hopper (left) is supported on a flat surface; the remainder of belt rides on idler rollers

Steel Belt Conveyors—

Maintenance and Repair Hints for Prolonging Belt Life

By OSSIAN EK, Sandvik Steel Belt Conveyors, Div. of Sandvik Steel, Inc., Fairlawn, N. J.

AS WITH MOST mechanical equipment, the maintenance required to keep steel belt conveyors in good operating condition depends upon correct conveyor design, proper installation, and the severity of operating conditions. Frequency of inspections depends upon the application and upon general plant conditions, but quarterly inspections usually are sufficient provided supervisory personnel promptly report any abnormal conditions arising between inspections and provided the maintenance department makes the necessary corrections as soon as they are reported.

Steel belt conveyors, as with all conveyors, should be used under the conditions for which they were designed. Changes in materials handled, quantities handled, operating temperatures, etc., may subject the conveyor to conditions for which it was not engineered. If operating conditions are changed, the conveyor should be altered to accommodate them.

As to the maintenance of the steel belt itself, the first thing to check is whether the belt is tracking correctly on the pulley. If it is not, simply adjust the movable bearing at the head pulley, Fig. 2. A properly designed conveyor will have one terminal bearing with a simple one-bolt adjustment for correcting improper tracking. Usually, only a quarter of a turn or so is necessary, and should the first adjustment cause the belt to travel too far toward the other end of the pulley, the adjustable bolt is simply reversed slightly.

This adjustment is the only one which may have to be made with reasonable frequency, particularly where temperature variations in processing operations cause belt expansion and contraction with resulting changes in tracking. In such applications, and where adjustments are to be made manually, supervisory personnel should be told how to make adjustments.

The belt should be properly tensioned. To determine whether tension is correct check sag of belt between idlers of lower strand. Sag should be as indicated in Fig. 3. Incorrect tension is rectified by adjusting the take-up bearings or changing the counterweight.

Steel belts should be checked to see that the edges are smoothly rounded; that there are no fatigue cracks; and that there are no torn sections. If the edges have a turned-up lip, file smooth, Fig. 5, to prevent fatigue cracks from forming, and also correct the rubbing condition responsible for the lip.

If a fatigue crack is detected at the belt edge, cut out a crescent-shaped piece where the crack appears and file the edge smooth. If the crack is not at the belt edge, drill small holes at each end to prevent spreading.

Should the belt be accidentally torn by a severe impact or by catching on some obstruction, cut out the torn section and splice in a new piece of belting.

Rivets at the belt joint should be checked and hammered tight when found to be loose. Also, the ends of the belt should be checked at the rivets for cracks; they are an indication that a new joint may be required.

In making a new joint, the old one is cut out, the take-up bearings moved forward and the ends of the belt overlapped and lined up, using a belt stretcher if necessary, Fig. 4. New rivet holes are then punched using a "die-bar" as a guide, Fig. 5, and the new rivets hammered in place.

Although steel belts last for many years, eventually the belt will take on a limp, uneven and generally worn appearance, at which time it should be replaced.

In connection with the maintenance of scrapers and cleaners, the "safety" scraper, pulley cleaner, belt scraper, if any, and belt discharge scraper, if any, should all be properly adjusted to scrape the surface for which they were designed. The "safety" scraper and pulley cleaner are illustrated in Fig. 6.

Should any of these devices be functioning incorrectly, they should be adjusted and if in a worn condition, the faces which contact the moving parts should be replaced.

Idlers should be clean, turning properly, and not badly worn. If material is allowed to build up on idler pulleys it may cause the belt to track to one side. Persistently unclean return idlers may indicate that a belt cleaner should be installed.

Idlers which are not turning will cause undue wear on the belt. They may simply need cleaning or a new bearing may be required. Naturally, worn idlers should be replaced.

Care of Guide Rollers

Guide rollers, mounted vertically along the belt edges, are designed to prevent the belt from rubbing against obstructions. They should turn properly and not be unduly worn. Rollers which do not turn result in excessive wear on both the roller and belt and should be cleaned and/or repaired or replaced.

At some installations guide rollers activate limit switches which operate automatic adjusting devices. In such cases both limit switches and adjustment devices should be checked. Limit switches, when triggered, should operate the adjusting device, and the adjusting device should correct excessive tracking to either side of the pulley. If either unit doesn't function properly, it should be re-aligned, repaired or replaced. Guide rollers are safety devices and should they wear rapidly or should the belt ride regularly against those on one side, it is an indication the belt is not tracking properly due to some continuing misalignment.

The motor and power transmission devices should be checked according to manufacturers instructions to be sure the conveyor is properly driven. Should deficiencies be discovered, they should be corrected according to manufacturers instructions.

Lubrication of bearings also should be carried out as per manufacturers instructions. Where operating conditions are unusual, perhaps from a temperature, corrosion or dust viewpoint, it might be well to have a representative of a lubrication manufacturer recommend proper lubrication procedures. Should parts fail due to lack of proper lubrication, they should be

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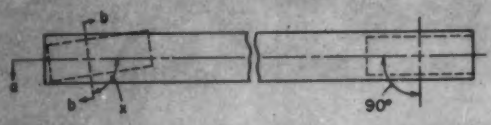
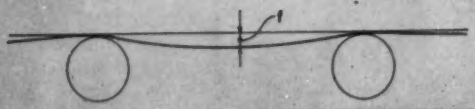


Fig. 2. If belt tracks to one side (a), adjust the movable head bearing as indicated in (b)



RETURN IDLER SPACING	FEET	10-13	13-16	16-20	20-23	23-26
SAG OF BELT f	INCHES	7/16	3/4	1 1/4	1 7/8	2 3/8

Fig. 3. Excessive sag in an unloaded belt (f) is corrected by adjusting the take-up pulley

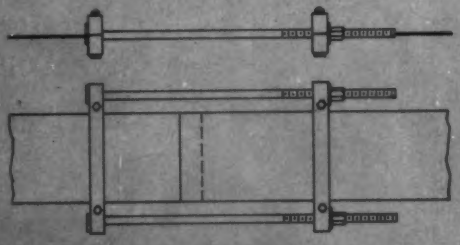


Fig. 4. To make new joint, use a belt stretcher when belt ends cannot be overlapped manually

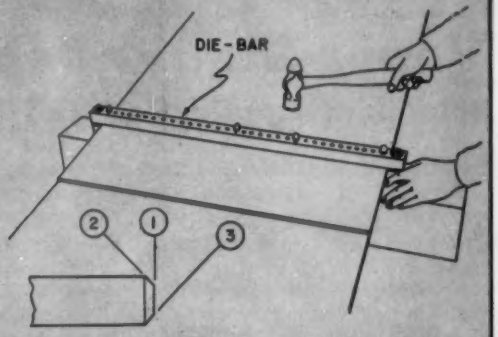


Fig. 5. "Die-bar" guides punch for new joint. To round edges, hold file against moving belt

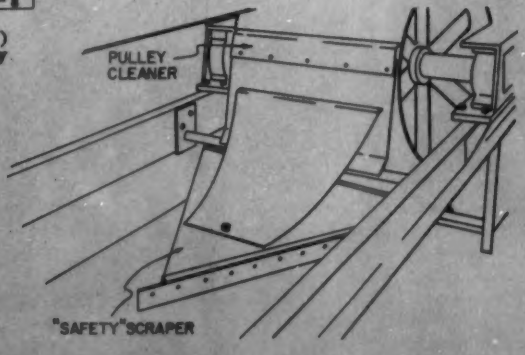


Fig. 6. Make necessary adjustment if "safety" scraper, pulley cleaner is not functioning properly

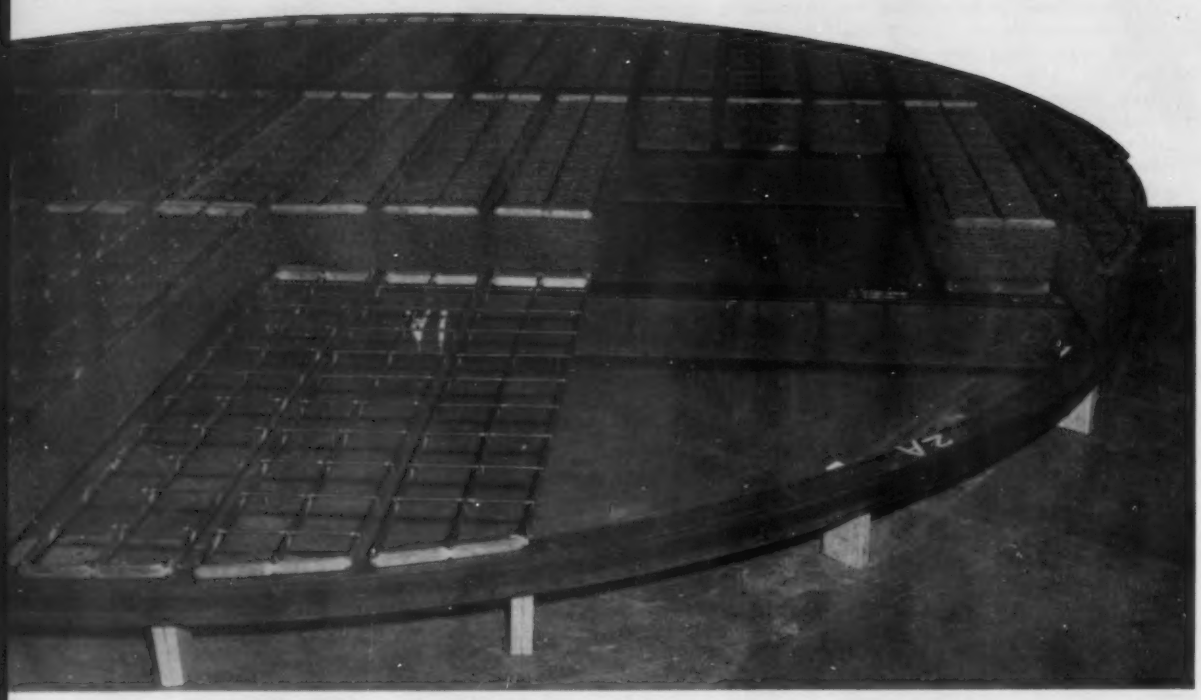


Fig. 1. There are various methods of installing wire mesh elements. In this illustration, it is assembled in sections for a large size vessel (to 40 ft in diameter). Many sheets of wire mesh are sandwiched together to make up a section

Vapor-Liquid Separators

Selection, Application and Use of Wire Mesh Elements

By JOHN L. REID, Process Engineer, Otto H. York Co., Inc.

WIRE MESH separators, in use in a number of industrial process vessels, are doing an effective job of separating liquids and vapors.

The principle behind the operation of a wire mesh separator is very simple. Here's what happens: As the vapor disengages from the liquid, it carries with it fine liquid droplets. When the vapor stream passes through the fine wire mesh, the liquid droplets impinge on the wire surfaces, coalesce into large drops, and fall off. The vapor is now dry and free from entrained liquid.

To get the best performance from this equipment, it is important that the wire mesh elements are installed in the process vessels in such a manner that all vapor must pass through the mesh.

The selection of the particular style for any specific application is based on the operating conditions and the performance requirements. In some cases maximum separation efficiency is the principal requirement while in others high throughput capacity or extremely low pressure drop may be of most importance.

The size and shape of the process vessel will determine whether the demister should be furnished in a one-piece construction or in sectional type construction. For installation in vertical cylindrical vessels where access can be had through the full open end of the vessel, the one-piece construction is more economical. Where installation is to be made through a manhole the sectional type is used.

These sections, usually 10 to 14 in. wide, are placed alongside each other in the vessel. Since the wire mesh is resilient, the sections are simply pushed tight one against the other, and sufficient interlocking occurs to prevent any vapor leakage between sections. The individual sections are cut to the proper curvature so that they will give a tight wall-to-wall fit. Any chance for vapor bypassing is thereby eliminated. Provisions can be made for downcomers, pipes, removable manways, etc.

Since demister elements are flexible, they must be supported on a grid. Light-weight grid sections have been developed for this purpose. Standard construction consists of ¼ in. round bars welded across ⅛ in. by 1 in. flats on edge.

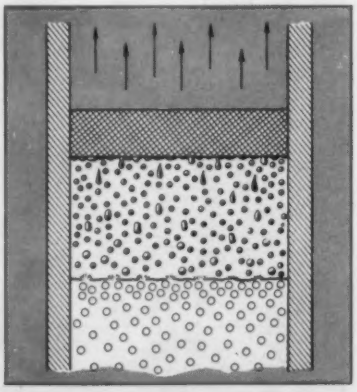


Fig. 2. Droplets impinge on wire surfaces, coalesce into large drops, fall off

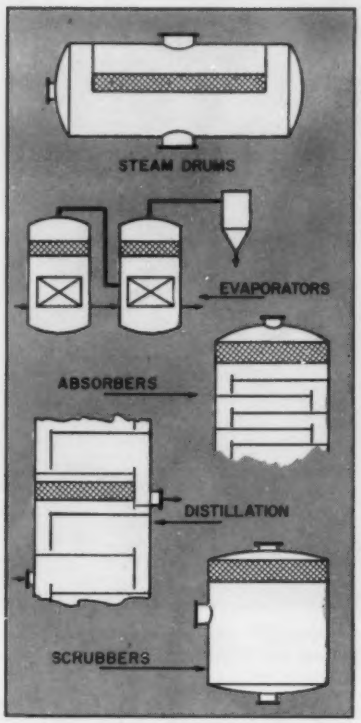


Fig. 3. Typical applications of wire mesh units for vapor-liquid separation

The light-weight grids are designed for a maximum span between supports of six feet. In vessels larger than six feet in diameter, intermediate supports, in addition to the annular support ring, are necessary. This arrangement has been found to be entirely suitable for demisters in all sizes of vessels up to 40 ft in diameter.

The annular support ring and intermediate supports may be of relatively light construction since the total load including the liquid load will generally be less than 12 psf of the demisting area. The ring may be a rolled angle or flat bar rolled on edge. If the ring and intermediate supports are provided with ¼ in. holes on about six inch centers, these holes may be conveniently used for fastening the wire mesh assembly to the supports with tie wire furnished by the manufacturer, Fig. 5.

If ordered with the grids, wire mesh demister elements will be shipped fastened to the individual grid sections. This simplifies and speeds installation. In installations where upset conditions may occur, it is usually advisable to furnish a top hold-down grid as well as the support grid. This arrangement has become known as a sandwich type unit.

Installation may be made from above or below the demisting level. If the installation is from above, the last section is anchored to adjacent sections which previously have been secured in place. Users can install their own units and no special tools or skills are required.

Following are typical applications of entrainment separators of various sizes and materials, as used in given installations. Also given are benefits achieved in the various cases.

Distillation—Inconel wire mesh used in a 29¼ in. ID column between still and condenser at 180 C and 25 mm Hg abs gives improved quality of 150 MW organic product while increasing production from 3000 to 4000 lb/hr.

Stainless steel was used in a four foot diameter chamber flashing a mixture of propane and asphalt at 245 psig and 450 F. Use of this unit corrected previous problem of asphalt entrainment in overhead propane.

Separators—Type 316 stainless element was installed in a four foot ID separator vessel to remove entrained liquid fatty acids from fatty acid vapor at 3000 lb/hr at 425 F and 20 mm Hg abs, with a pressure drop less than 0.5 mm Hg.

Absorbers—Carbon steel element was used for one half of a 12 ft 6 in. OD tower for preventing loss of 24.5 API absorbent oil from 1,000,000 standard cubic feet per hour manufactured gas at 30 in. to 85 in. water gage and 80 to 110 F with a pressure drop of 0.2 in. water gage maximum.

Evaporators—316 stainless steel element installed in a four foot diameter evaporator concentrating 300 gph of a valuable inorganic fluoride solution at four inch Hg abs eliminated entrainment loss which previously was the main yield reducer.

Knock-out Drums—An aluminum demister was installed in a 12 ft 6 in. ID air surge tank removing 8000 lb/hr entrained water from 410,000 lb/hr air at 107 psia, 60 F, with maximum pressure drop across demister four inch water gage.

Stainless mesh, 2 ft 6 in. by 4 ft, is used for removing entrained hydrocarbons and water from 7,280 standard cubic feet per minute mixed gas of 33.8 molecular weight in a first stage compressor dry drum at 7 psig, 100 F.

Stainless mesh, 3 ft 5 in. in diameter, is used for eliminating liquid hydrocarbons and water from a mixed gas of 31.4 molecular weight flowing at 8600 standard cubic feet per minute in an interstage compressor accumulator at 55.3 psig and 100 F.

A stainless demister was installed in a 29½ in. ID vessel for removing fatty acids and neutral oil from 240 lb/hr superheated steam at 300 F and 6 mm Hg abs with pressure drop less than 0.5 mm Hg.

Gas Filter—Monel wire mesh 6 in. by 24 in. is used to separate sulphuric acid, ferric sulphate and carbon from chlorine gas at 100 F, 20 psig.

A steel demister, 10 ft in diameter, is used to remove 93 per cent sulfuric acid and solids from 4800 cfm of chlorine at 100 F and 13 psia.

Scrubbers—Red brass element for a 3 ft 8¾ in. ID scrubber tower separates water from 17,600 lb/hr of 88

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Fig. 4. Here is another method of installing wire mesh. Workers place new mesh over existing grids, foreground

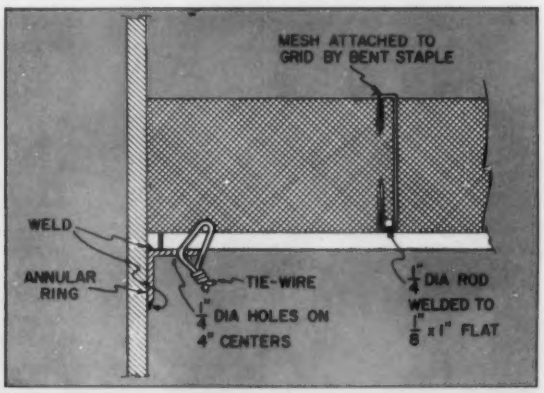


Fig. 5. Sketch illustrates how wire mesh is installed on open grids and secured to annular rings which are welded to vessel

Fig. 1. First stop for a disabled motor is in foreground where a thorough diagnosis of the motor is made. From here it moves to the various operations—flow lines are indicated by arrows. Several operations are illustrated on following page

Motors Are Rebuilt in Eight Hours

GE Production Line Is Equipped to Service 1 to 50 Hp Motors

Completely automatic baking oven and integrated conveyor lines have helped General Electric cut service time of repairing these motors by over 50 per cent

PRODUCTION-LINE servicing of electric motors has cut repair time by 50 per cent at General Electric Company's Chicago Apparatus Service Shop.

Motors up through 50 hp can now be diagnosed, disassembled, cleaned, rewired, rebuilt, tested and ready for delivery in eight hours. This faster time compares with about 19 hours normally required for complete motor service.

Trained personnel first disassemble the motor, examine the parts and fits, and then make a diagnosis. After necessary data is recorded, the coil department is notified what coils should be made and ready for the winders when the stator arrives in that section.

All motor parts then receive a thorough cleaning in an agitator. At the same time, the stator is prepared for roasting to simplify the job of removing the old wiring. Any required machine work on the shaft or end shields is also done at this time.

After the stators are baked out in an oven designed to protect the motors' characteristics, a sandblasting machine removes old paint and scale in order to provide a clean base for the protective coat.

New insulated coils are then inserted in the stator slots. Polyester slot cells are also used for standard rewinding jobs. Glass, silicone and epoxy treatments are used when required.

Rewound, the stator is then dipped in a specially developed varnish. After it has been varnished, the stator moves on to the bake oven.

The bake oven, which cuts bake time from six to two hours, was specifically designed for this production line. A conveyorized line carries the stator through the oven which operates at considerably higher temperatures than with other manually loaded ovens. This new automatic unit indexes every half hour. With its fast recuperating power, the oven regains its temperature loss in a few seconds after the doors open and close. After it leaves the baking oven, the stator receives a special moisture proofing treatment.

At the reassembly station, new bearings and other needed parts are installed. Still on the assembly line, the rebuilt motor is painted in a specially designed down-draft spray booth.

At the testing station, all three leads from the motor are connected at one time as the thorough testing procedure is conducted. Simultaneously, the unit is put through a running test, phase balance and high potential check.

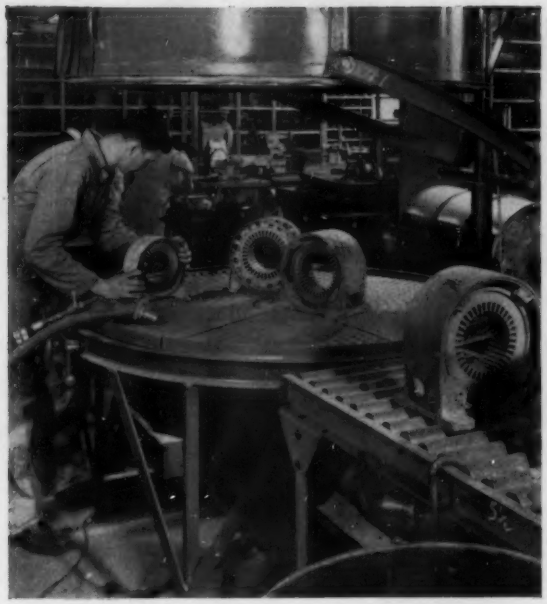


Fig. 2. After stators are baked out in special oven, they move to sandblasting where old paint, scale is removed

Fig. 3. From sandblasting, they go to rewiring where insulation, pre-wound coils are inserted

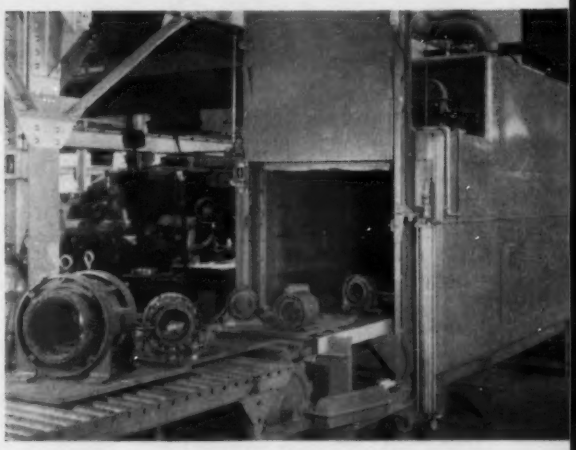


Fig. 4. After the wound stator has been dipped in varnish, it moves on a conveyor line to the baking oven

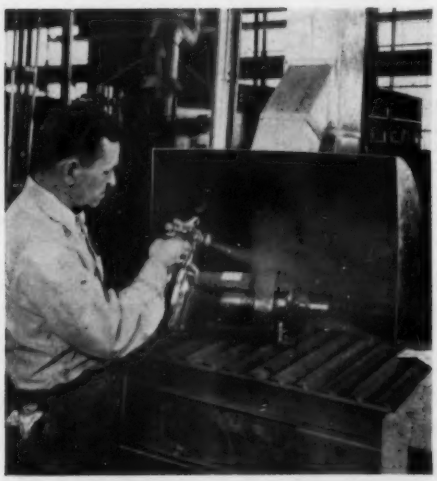


Fig. 5. Down-draft paint spray booth on line provides smooth flow from painting to testing

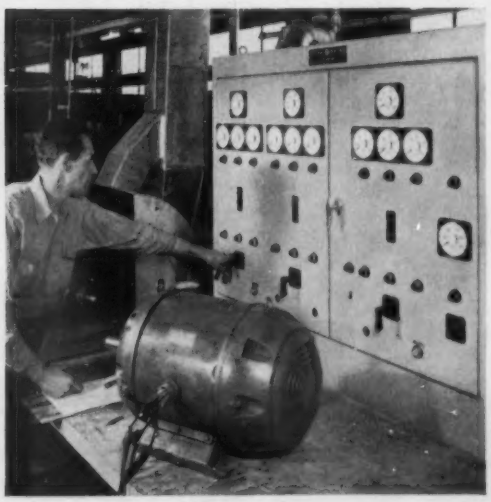


Fig. 6. At test station, motor leads are connected for three simultaneous but separate checks

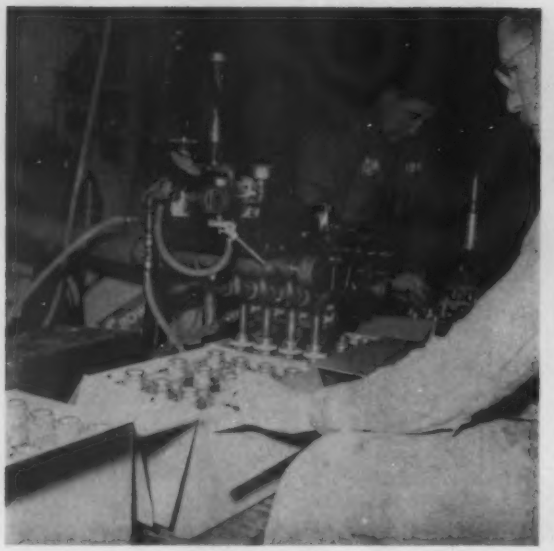
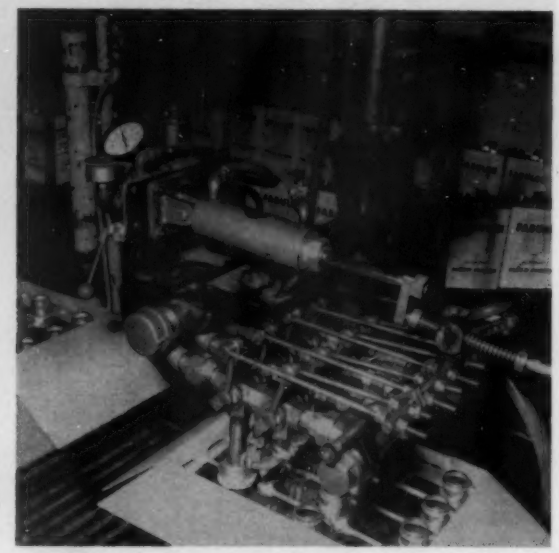


Fig. 1. Container positioning under nozzles is done manually

Fig. 2. Rubber gaskets fit over the can openings for filling



Can-Filler Pays Dividends

Puts Liquids in Cans Still in Shipping Container

By T. H. TUCKER, Plant Superintendent, Pierce & Stevens Chemical Corp.

THROUGH THE EFFORTS of the engineers at the Pierce & Stevens Chem. Corp. plant in Buffalo, N. Y., an unusual system for filling cans with paint without removing them from the cartons has been made possible. Among the components of this arrangement are eight standard three-way plug valves working in pairs. Two of the openings of these valves are soldered together. The opposite ends are piped to supply and vacuum manifolds respectively.

Support for the entire filling unit is a vertical pipe column. The unit is counterweighted and its vertical movement results from the action of a vertically-mounted air cylinder transmitting force through a linkage system. All the plug valves are operated in unison; valve action is effected through a master bar which is actuated by means of a horizontally-mounted pneumatic cylinder, Fig. 3.

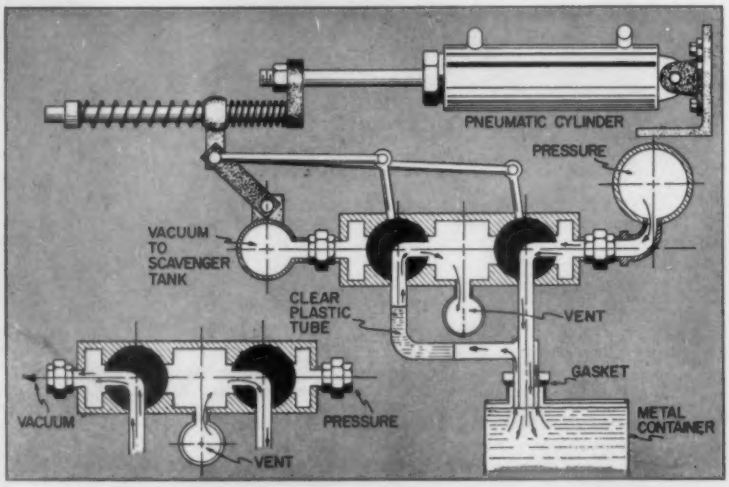
Nozzles consist of concentric pipes. The outer passage of the filler pipe is connected to the bottom opening of the plug valve nearest the manifold. The major portion of this connection is made of plastic tubing. The passage between each pair of plug valves is piped to a vent manifold.

Liquid is supplied to the filling head at 5 to 10 psi. The counterbalanced filling head is lowered and the concentric pipes or nozzles enter the cans. Space between the can opening and the nozzle is sealed by means of a rubber-padded ring.

The operator then actuates the valve to the pneumatic cylinder and the plug valves are set for pouring and venting at the same time. He knows that the containers are full by the appearance of the liquid in the plastic tube. Then the operator, by means of a pneumatic cylinder actuates the plug valves. The overage in the plastic tube is drawn into a scavenge tank.

A four man crew operates the production line at this plant, from supplying the filler with cartons of cans, to filling, capping, sealing cartons and storing at rates of two cartons per minute. With the use of this semi-automatic filling unit, 12 quarts in a carton can be filled in 30 seconds.

Fig. 3. Piston actuates all the plug valves at one time through a common bar



From Britain to Southern Europe

Editorial Director Highlights European Tour Itinerary

By DICK MORRIS, Editorial Director, Plant Engineering

QUITE NATURALLY we are frequently asked, "Why spend the summer in Europe when there is so much to cover in America?" The "we" consists of Andy Kramer, Tom Hanson's opposite on *Power Engineering*, and myself representing PLANT ENGINEERING. To us the answers are quite obvious.

First: Our editors traveled a quarter of a million miles in North America last year. Even a three-fold increase in this travel would not materially change our article selection whereas comparatively little travel outside established orbits opens up new possibilities.

Second: The importance of the Canadian and United States engineers' national and international activities calls for adequate representation of our engineering societies at international engineering events. Through the summer I will act as the official delegate of the American Institute of Plant Engineers to four international conferences.

Third: Rapid industrial recovery of West Germany and Italy, aggressive trade practices of Sweden and Switzerland, and expanding reciprocal trade agreements of the Soviet Union are already posing grave political, economic and industrial problems to the U. S. and Canada. American industrial paper editors should be cognizant of these impending changes.

Plant Engineers—Worldwide

Fourth: I am mainly concerned with the plant engineer, his problems, interests, organization and activities around the world. Thus we establish this specialized branch of engineering as an essential function of industry. By example, we can trace the growing world wide trend of modern industry to group plant engineering activities in a single department.

Already there is a great deal of evidence to indicate the plant engineer is much the same wherever he operates. Many areas in the world have already been investigated. The entire Western Hemisphere has been surveyed by the American Institute of Plant Engineers from Northern Canada south to Rio de Janeiro.

The Incorporated Plant Engineers have nearly 3,500 members in parts of the British Empire, a phenomenal growth since its founding in 1946. From various foreign teams involved in the Point Four and ECA programs we know that the plant engineer is rapidly coming to the forefront as industry develops in other countries.

Fig. 1. Dick Morris attending the annual Incorporated Plant Engineers' Conference in Harrogate, England addresses members of group at one of the sessions

Finally, wherever these investigations lead we depend upon the maintenance crews of the airlines for our safety and peace of mind. Nowhere in industry has preventive maintenance been more highly developed. Nowhere is its effectiveness more appreciated by customer and management alike.

About 1950 the airlines boasted half a million trans-Atlantic passengers. Air travelers then were a snobby lot. The occasional passenger who had not circumnavigated the globe at least once was low on the social scale. By comparison the seafarer who was initiated by Neptune at the equator was minor nobility. The camaraderie of the elite was unsurpassed.

Today millions fly the Atlantic each year. The elite, like nobility, have bowed to the proletariat and pass unnoticed in the rush. Mobs pass through the gates, as through subway turnstiles, and with as little regard for their neighbors.

So commonplace is this mode of travel that one can travel half way around the world hesitating to interrupt seat companions in the perusal of a newspaper. Newspapers one may pick up on the way may be in a dozen languages.

Yet in the air crossroads of the world, few need be embarrassed by the ability to read but one language. Sign painters are sympathetic souls cognizant of human needs in many languages. One may casually choose between "herren", "caballeros", "l'hommes", "gentlemen," etc. Only the Russians and Arabs have been overlooked in the parts of the world already visited. And in Germany a note of caution—keep a 10 pfennig piece handy.

In spite of these conveniences, one cannot avoid marvelling at the speed of modern transport. Lunch in Chicago on Thursday; dinner with the Niagara-Frontier Plant Engineers' Club on the same day; lunch with members of the Glasgow Branch of the Incorporated Plant Engineers on Saturday; Wednesday in Hamburg; Thursday in Berlin and Monday in London.

Glasgow

In Glasgow John Brown's Shipyard on-the-Clyde has laid the keels of 700 ships since 1852, including the Queen Mary and the Queen Elizabeth. Here Rolls-Royce build their turbo-prop engines which power the Capital and Trans-Canada Airlines' Viscounts in America. In Edinburgh the "castle" dates back to 1050 but carpets and "beefsteak and kidney pie" are modern.

Scotland is a land of lochs, fens, black face sheep, highland cattle, flowers, kilts, glens, inns and friends that can be left only with regrets and a strong desire to return.

Hamburg, quite impartial between hamburgers and hot dogs, has been reasonably well rebuilt. Rivers and

(Continued on page 184)

Montreal members of the Plant Engineers' Society of Eastern Canada, recently held a meeting at the Mount Royal Hotel, to discuss the possibility of augmenting the semi-annual meetings with monthly get-togethers in Montreal

Activities of Plant Engineers' Societies

New Canadian Chapter, Symbol for Pittsburgh, New Club Officers

AS THE NUMBER of Plant Engineers' Societies increases so will their activities. Following is a brief report of what some of these Societies are doing:

Montreal Meeting

Montreal members of the Plant Engineers' Society of Eastern Canada, Chapter 27 of the AIPE, recently held a meeting at the Mount Royal Hotel. Their immediate objective was to explore the possibility of augmenting the proposed semi-annual meeting periods of this chapter, which is widely distributed geographically, by more frequent meetings in the Montreal area.

At this meeting the organizational structure of a new chapter was outlined. Jim Ross of Noranda Copper and Brass Ltd., was elected president of the group, and Allan Carlyle of Canadian Car & Foundry Co. will assist him as secretary-treasurer.

Members of the American Institute of Plant Engineers who were at the Philadelphia meeting in January will recognize Allan Carlyle, a delegate-at-large at the convention, and his two fellow Canadian members Jack Kingston and John Brown.

Men identified in the picture above, left to right, are: H. Nolan, Canadian & Dominion Sugar; L. Mathys and W. A. Campbell, both of Northern Electric Co.; J. Brown, *Maintenance Engineering* magazine; N. J. Quist, Monsanto Chemical Co.; F. C. Purvis, British American Oil Co.; J. G. Hungate, Canadian Tube & Steel Co.; R. H. Morris, PLANT ENGINEERING magazine.

A. M. Carlyle, Canadian Car & Foundry Co.; H. E. Egbert, Canadair Ltd., (Chartierville); W. B. Morrison, British American Oil Co., (Montreal East); J. E. Kingston, Canadian Pratt & Whitney (Longueuil); T. L. Johnson, George Weston Ltd., (Jacques Cartier); J. H. Ross, Noranda Copper & Brass Ltd., (Montreal East); and C. G. Bryan, Canadian Car & Foundry.

Buffalo

Members of the Buffalo Plant Engineers' Society, organized on March 20 of this year, recently held their election of officers.

Officers elected at this meeting were: T. J. Galvin, of Rugby Knitting Mills, Inc., president; M. Ryen, of Curtiss-Wright Corp., vice president; H. A. Dreyer, Fedders-Quigan Corp., secretary; and A. Randolph, Ford Motor Co., treasurer.

Board of Directors for a two-year period will be: W. R. Trautman, Cornell Aeronautical Laboratory, Inc.; H. W. Wollenberg, Buffalo Weaving and Belting Co.; and A. Randolph, Ford Motor Co.

Board of Directors for a one-year period will be: T. J. Galvin; A. J. Smith, Niagara Machine and Tool Works; M. Ryen; and H. A. Dreyer.

Mohawk-Hudson

The Mohawk-Hudson Chapter had a number of visitors at one of their recent meetings to find out more about the American Institute of Plant Engineers and to see how the local chapter conducts a regular meeting.

In addition to getting more information about the AIPE, the visitors, along with the chapter members, heard an interesting roundtable discussion on the subject: Fuel Oil Additives. In fact, it was necessary to schedule the other two subjects for the next meeting because of the amount of time spent on this subject.

Valley Forge

At the second meeting, members of the Valley Forge Plant Engineers' Club, organized on April 16, approved a Club Constitution and also held their election of officers.

G. Russell, of American Chemical Paint Co., will be the president; P. Damm, Sharp and Dohme, Div. of Merck & Co., Inc., will be the vice

president; and J. Lundelius, Superior Tube Co., will serve as secretary-treasurer.

Board Member for a one-year period will be C. Johnston, Lansdale Tube Co.; Board Member for a two-year period will be H. Blagrove, Leeds & Northrup Co.

Members of the Program Committee will be: L. Fisher, American Encaustic Tile Co.; P. Repino, Lebanon Steel Foundry; and H. I. Hess, Keasbey & Mattison Co.

New Jersey

New officers for the Plant Engineers' Club of New Jersey will be: N. Marchak, of Sun Tube Corp., president; H. A. Smith, Diamond Alkali Corp., vice president; and W. H. Nagel, The Lionel Corp., secretary-treasurer.

They also had an interesting program at this meeting presented by two representatives of the Tremco Mfg. Co. Mr. Apgar presented slides on masonry problems and their solutions, and Mr. Cline conducted an interesting session on roofing faults, their causes and solutions.

Chicago

Members and guests of the Plant Engineers' Society of Chicago heard a very interesting presentation about the chemical properties of Teflon, and about its applications as a packing, gasket and mechanical material.

This discussion clinic, presented by employees of the Du Pont Company, was divided into four sections: The Story of Teflon; Packings and Gaskets; Mechanical Applications; and a Question and Answer Panel.

In addition to the Clinic, the group also learned the results of their recent balloting for new officers. The new president will be H. G. Anderson of Link-Belt Co. He will be assisted by M. F. Cavanaugh, of Fort Wayne Corrugated Paper Co., as vice president; and K. N. Banthin, of The Visking Corp., as secretary-treasurer. H. J. Seither, Jr., of International Harvester Co., will serve as Junior Board Member for the coming year.

Pittsburgh

Here is the symbol adopted by the Plant Engineers' Association of Greater Pittsburgh for its stationery.

Many members from the other chapters will recognize the similarity to the Western Hemisphere symbol presently being used by the American Institute of Plant Engineers. The reason for this is that Bob Hiller, member of the Pittsburgh Chapter, and President of the AIPE, has re-worked the symbol he had suggested for the AIPE for possible use by an individual chapter.

Los Angeles

Members and guests attending a recent meeting of the Plant Engineers' Society of Los Angeles heard two interesting talks on acid handling and smoke abatement.

The first talk "Acid Handling and Disposal," was presented by Wayne Clark, Los Angeles City Engineering Dept., Industrial Waste Division.

The second talk: "Smoke Abatement and Smog Control," was presented by R. Sloan, Sr., Engineer, American Air Filter Co.

Piedmont

Officers for the new fiscal year of the Piedmont Chapter of the American Institute of Plant Engineers will be: W. O. Ameen, Western Electric Co., president; S. L. Carter, P. H. Hanes Knitting Co., vice president; J. W. Voss, Jr., Southern Steel Stampings, Inc., secretary; and C. R. Biggs, Container Corp. of America, treasurer.

Kentuckiana

New officers for the Kentuckiana Plant Engineers' Society will be: E. B. Worth, of Philip Morris & Co., Inc., president; J. Vonderheide, General Electric, vice president; B. E. Head, Jr., P. Lorillard Co., secretary-treasurer.

Member-at-Large for two-year period will be J. C. Morris, Jr., Colgate-Palmolive Co.; for one-year period, W. A. Wade, Philip Morris & Co., Inc.

Members and guests of the Mohawk-Hudson Chapter of the AIPE heard an interesting roundtable discussion about fuel oil additives at one of their recent meetings. A number of visitors attended to learn more about AIPE activities

Fig. 1. An hydraulic dynamometer test installation, like a big iceberg, has a lot below the surface. Here is the nearly completed foundation excavated for the new dynamometer and double-ended test stand

New Test Unit Created New Problems

Dynamometer Installation Called for Many Special Features

By **FRANK REEVE**, Foreman, Maintenance Department, Enterprise Engine & Machinery Co.

BOOSTING THE capacity of your engine test facilities to include a 10,000-hp, 400-rpm hydraulic dynamometer would be no small chore for any engine builder. Enterprise Engine & Machinery Co. of San Francisco has done it to meet the need for greater capacity on a single test stand.

The work of installations was urgent, because our new RV-series engines, rated over 7,000 hp, were ready for testing early this year.

The hydraulic dynamometer, at its simplest, is a water wheel operating in reverse. The engine on test is powered in conventional manner by diesel oil, natural gas, or other fuels singly or in combination. Lacking any load to drive, it expends its energy—and is prevented from running away—by driving a large, bucketed wheel turning in a cylindrical casing of water. With the casing restrained from revolving only by a Dale pivot and linkage to a scale, it becomes a dynamometer arm for measuring the horsepower output of the engine under any given condition of operation.

Our new "brake" is big—13 ft long

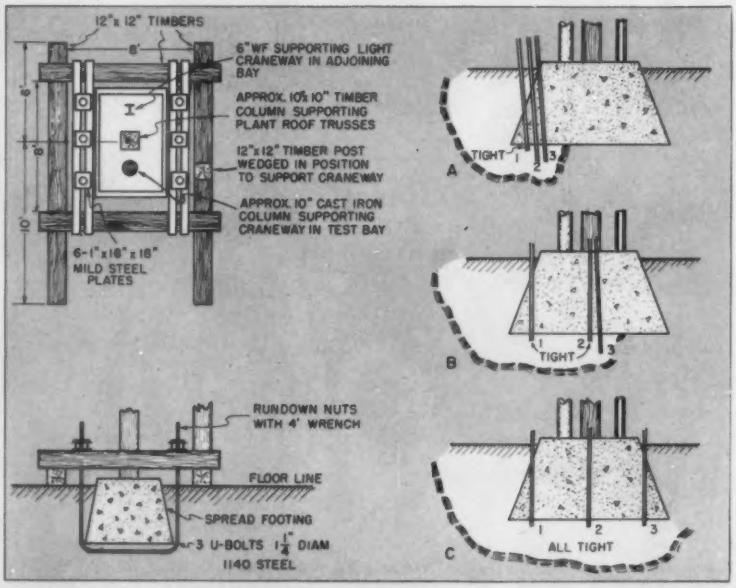

12"x 12" TIMBERS
6"WF SUPPORTING LIGHT CRANEWAY IN ADJOINING BAY
APPROX. 10½ 10" TIMBER COLUMN SUPPORTING PLANT ROOF TRUSSES
12"x12" TIMBER POST WEDGED IN POSITION TO SUPPORT CRANEWAY
APPROX. 10" CAST IRON COLUMN SUPPORTING CRANEWAY IN TEST BAY
6-1"x16"x18" MILD STEEL PLATES
TIGHT
A
B
C
RUNDOWN NUTS WITH 4' WRENCH
FLOOR LINE
SPREAD FOOTING
3 U-BOLTS 1¼" DIAM 1140 STEEL
ALL TIGHT

Fig. 2. Sketch shows how four footings had to be underpinned and then concreted down to full test stand pit depth before pit itself could be excavated. Illustrations A, B, and C show how the U-bolts were placed under the spread footing. With U-bolts tight, the column and footing load is carried by bolts, plates, beams

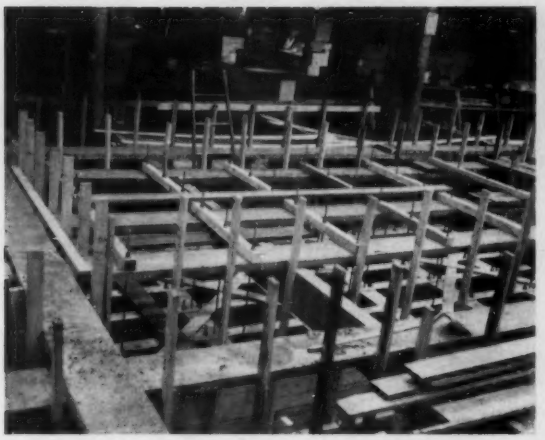


Fig. 3. Formwork was extensive and had to be husky to withstand stresses of continuous concrete pouring operations

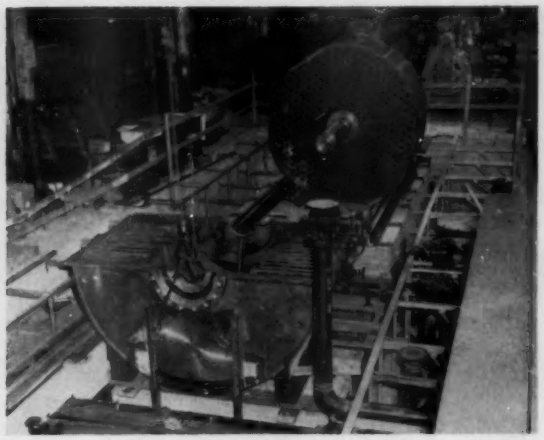


Fig. 4. Sliding gates are placed in guides of casing, foreground. Rotor rests temporarily on test stand parallels

and 10 ft in diameter. But this isn't the full measure of its effect on the production operations and plant facilities. It has nearly tripled the plant area used for test work. Here's why the new installation takes so much space.

To cut down on multiple handling of completed engines, the big new RV models will be assembled on the test stand. This takes time, both for assembly and for later disassembly. So, to keep the dynamometer from being tied up with just a single engine at a time, the project area was extended to take in a "double-ended" test stand. This, together with design for dynamometer rotation in either direction, means added flexibility in handling marine engines, which often are furnished in matched pairs having opposite shaft directions.

With the addition of, in effect, two test stands integral with the dynamometer itself, we now have a project area 76 ft long. Every inch of it required special preparation, beginning with excavation to provide firm foundations for dynamometer and test engines, a sump for dynamometer water, and a special surrounding "basement" for installation of utility conduit and piping. Designing these features rounded out the size of the job: width of 22 ft and minimum depth of 12½ ft. As it turned out, the excavated width was closer to 27 ft, and the depth reached 14½ ft.

Disposition of Heat Energy

Along with construction of the pit, provision had to be made elsewhere for disposition of heat energy. Electrical circuits from the existing dynamometers lead to the plant roof, where resistors convert generated power to heat which radiates into the atmosphere. The new arrangement is more complex in this regard.

Dynamometer water is circulated through its own closed system at about 800 gpm, with a Young radiator performing the cooling. Another Young radiator handles the test engine jacket water, circulating at about 1000 gpm. Lube oil cooling water is the third liquid to be handled, and a Marley cooling tower was specified for this 600-gpm system. All this apparatus is mounted on a platform above a plant bay immediately adjoining the dynamometer area.

Structural steel framing had to be newly built to carry these elements, including columns brought up from new concrete footings poured for the purpose. The framing was designed and erected by Moore Dry Dock Co., with bolts as the primary means of making connections. Their crane and personnel then remained on the job for installation of the cooling apparatus under the direction of consultants from the Marley and Young companies.

Piping to serve the cooling elements is no interference to plant operations Compactly grouped together, the separate pipes are carried aloft in the

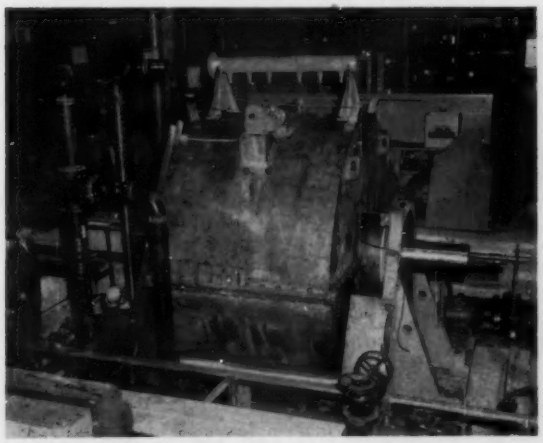


Fig. 5. Dynamometer gets finishing touches of auxiliary equipment. Motor on casing raises and lowers sliding gates

Fig. 6. The unit is now ready to go to work. Workers connect dynamometer to shaft of first engine to go on test

plane of a partition; they cross the floor in a permanently accessible, concrete-lined utilities trench. And all pumps are centrally placed in the utilities pit surrounding the test stands. The design and construction of this pit, and the structure of racks carrying the piping and removable floor plates, is one of the most interesting features of this installation.

Here is a utilities set-up that, on paper, looks no less puzzling than many others. Perhaps more so. But, on the ground it is a perfect cinch to trace out, maintain, or alter. The actual installation itself is a better reference than its engineering drawings! A look below the floor plates shows why.

Separate systems are carried here for the following: fuel oil, lube oil, test engine jacket water, lube oil cooling water and dynamometer water. In addition to the pumps required for each system, there is also a full flow filter for lube oil. There are lighting circuits and conduit carrying electrical energy for pump motors and thermocouples. And there is a maze of copper tubing suited to any desired system of hydraulically operated test instrumentation—manometers, gauges, controls, etc.

Treat Make-up Water

Finally, the water used is not standard municipal supply. Instead, we operate our own treatment facility for make-up water, insuring against the occurrence of rust, corrosion, deposits, or the formation of algae that would block fluid flows or lead to expensive inefficiency.

The orderly solution to the problem of separating and supporting these many utilities circuits was found in Kindorf Co. hangers and brackets, coupled with the same firm's Structor line of steel channels and fittings. A system of concrete inserts adapted all these to the test stand pit construction.

The support channels are the basic framing in the pit, and these are carried clear up to plant floor level as a system of light columns and beams that carry the removable floor plates. Channel inserts, set in the concrete pit walls, provide firm points for tying the system laterally. And careful selection among the available clamps, straps, hangers, saddles, connectors, and brackets rounded out the design. It's a completely flexible system, which can be easily disassembled or modified as necessary.

To handle construction of this facility took careful planning so that plant production operations would not be disrupted. The background and experience of the general contractor, Ed Rosemont of San Francisco, paid off at this point.

Pit excavation amounted to about 950 cu yd, with one side right along a line of columns supporting the roof trusses and a pair of crane ways serving adjoining bays. The original footings were just below the floor and had to be extended downward to full pit depth.

Pit construction required underpinning of crane way columns, but the work was carried out so that crane traffic was never stopped. Here's what had to be done:

To hold the columns at elevation, 8-in. wide flange steel members were laid horizontally alongside the columns, bridging to a rough grid of 12 by 12 timbers that would distribute the load to the floor area away from the footings. Hand excavation was then carried down under one edge of a footing, and a 1¼-in. U-bolt shoved under. The threaded ends of the bolt were passed through a steel plate laid across the wide flange beams. Running down the nuts on the bolt picked the column load from the ground and transferred it, footing and all, to the timber grid.

Repeating the process three times, extending the hand excavation each time, resulted in complete undercutting of the footing and the setting of three U-bolts. Excavation could then be carried clear down and the new footing, formed and poured. During all this work, the plant's overhead crane carried loads up to 94,000 lb. As a precaution, level readings were taken constantly on the columns. When it was all over, nothing had settled at all; in fact, the columns were up a fraction—by the amount of jacking that had been done to compensate for expected settlement!

Sides of the main excavation stood well, without shoring. The digging was done by a small crawler tractor fitted with a front-end loader. Dirt was bladed or lifted into a skip and handled by the plant crane to waiting dump trucks at the plant door. Water was an intermittent problem, with early flows of 500 gph tapering off to about 50 gph as the work continued.

Formwork had to be carefully planned. Inserts for the Structor framing had to be provided, and a great deal of steel reinforcement was needed. The basic pattern was composed of 1-in. bars on 5-in. centers, both ways. Walls were formed 14-in. thick. Since the entire pit and both test stands were to be placed in a single continuous pour, without joists, support of forms, steel and embedded parts could have been trouble. A plant floor level system of 3 by 15 in. timber joints from which steel and forms could be suspended at critical points was the answer.

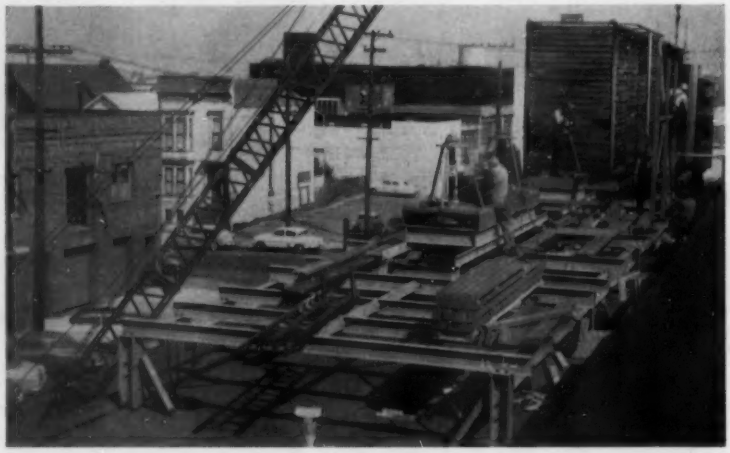


Fig. 7. Structural steel support for cooling facilities rises above the plant roof. Framework, foreground, is already in place. This will hold the radiator sections

Concrete placement consumed 480 cu yd, scheduled and carried out according to plan when all existing test stands were in use and there were no engines on the move overhead. Transit-mix trucks drove right into the plant and discharged directly into the forms. The concrete was basically a 6-sack mix with a 6-in. slump, with 2 per cent calcium chloride for faster setting. Rock size was varied, beginning with ¾-in. maximum, then changing to 1¼-in. for most of the yardage, and returning to ¾-in. at the top where engine foundation studs and other embedded parts were placed. Thorough vibration accompanied the work.

Topping out concrete was the signal first for form stripping, then for installation of hardware items. Founda-

tion rails for the test stands were bolted to their embedded studs and then grouted firmly in place. And Enterprise personnel moved in to assemble the Structor framing. Piping was installed on contract by Anderson & Rowe, Inc., of San Francisco.

Outside the pit itself, power had to be brought in from the plant's central board. This required about 120 ft of 440-volt feeder to a new Westinghouse control center. Brayer Electric Co. did the work.

Putting the pit together paved the way for putting the dynamometer together. This was also an unprecedented chore, involving unusual solutions in both design and fabrication.

In design the dynamometer follows conventional style except for one important feature. This is the means of controlling water level in the casing. Ordinarily this is done by valves in inlet and outlet water lines. But such valves are subject to interference by changes in supply pressure. The result is a wandering or fluctuation of brake load even when engine operation remains constant.

Gates Control Water Level

The solution, adapted from an earlier 26-in. dynamometer by the same designer, was the use of vertical sliding gates in the dynamometer casing. Controlled by an electric motor and a small drum hoist, these gates—in each end—function like a weir, releasing water according to height. The gates thereby control water level in the casing regardless of supply pressure changes.

In fabrication, diameter was the problem. The design called for a 9-ft rotor, but 1¼-in. mild carbon plate is customarily rolled only to 8-ft width. The answer here was a special mill order handled by Joseph T. Ryerson & Son, Inc.

A dozen plates were required for the rotor. Drilled through in a pattern of 3-in. holes, they were then assembled alternately in sequence with spacer rings 3¼-in. thick. Final centerbore machining of this welded assembly provided for press fitting it to the dynamometer shaft.

Stator plates were similarly drilled, but were cut into rough semi-circles for welded assembly inside the two halves of the dynamometer casing. When the shaft, rotor, and both casing sections were finally in place, the assembly weighed over 90,000 lb. In operation, the holes of stator and rotor act as fixed and moving blades. But unlike the design of a power turbine, the idea here is for hydraulic inefficiency to absorb the most diesel engine horsepower in the least space.

"Least space," as has been seen, is a fair sized area for a 10,000-hp dynamometer. But we believe we have achieved an installation that is unmatched anywhere for its convenience of maintenance and flexibility of use.

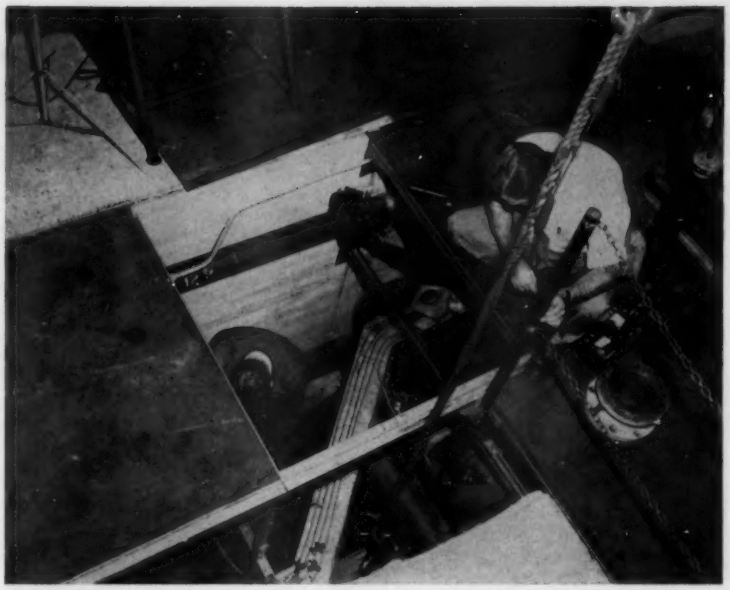


Fig. 8. Easy access and plenty of light through floor openings simplifies job of maintaining services. Note tray carrying neatly installed hydraulic lines

The dynamometer, from its conception to its operation today, has been a project of John Sheusner, operations manager for Enterprise Engine & Machinery Co. The brake itself was designed under the supervison of Don Morris, by Adair Roberts.

The design of the test stands and utilities system was conceived by Fred Reibin, then plant engineer. He carried the project through the detail stage in all respects, including administration of construction by the general contractor and subsequent specialty contractors involved. Suggestions and assistance were obtained from Al Radke, general foreman of assembly and test, who was to direct the new test stand in operation.

For the general contractor, Robert Rosemont was foreman on underpinning and pit construction work.

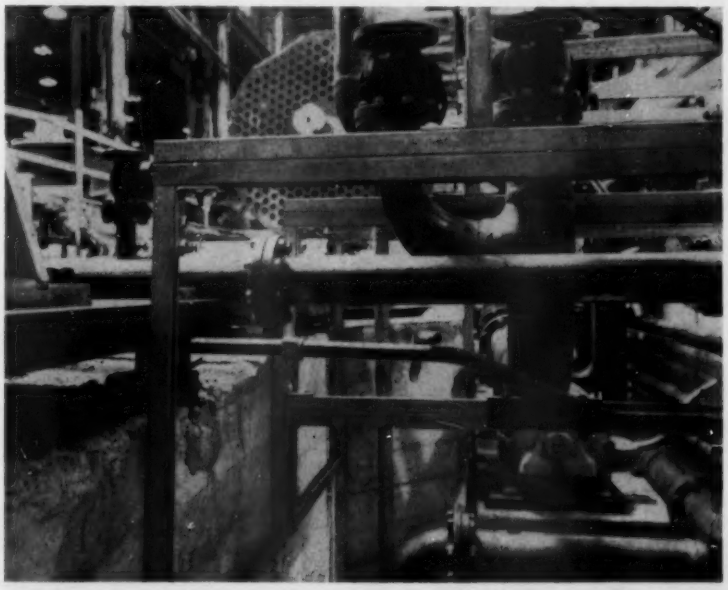


Fig. 9. Adjustable framing supports the many utilities for this test installation. The framing can be easily dismantled or modified as conditions demand

Pneumatic Carrier System at Ford—

Saves Time and Legwork on Assembly Orders

Fig. 1. Each new car is scheduled when card is punched with individual orders

Fig. 2. Orders are received, completed schedules returned, in body trim department

THE NEW FORD plant at Mahwah, N. J., can best be described as "big": planning big, producing big, building big. In its one-room assembly area of nearly two million square feet, it can turn out 1100 cars and light trucks each day. It has the latest labor-saving devices, including 11 miles of conveyors.

In spite of its size, 19½ man days are saved each day by using a pneumatic carrier system, instead of leg power, for control and communications.

Each car is built on a specific dealer order which describes the model, optional equipment, color of paint and color and type of upholstery. The combinations that can be assembled from all the variable items run to a couple of hundred and each must be accurately controlled because each item is priced separately.

The control system used in this plant is built around IBM punch cards and a 26-station Lamson automatic switch Airtube. Individual specifications are punched into a card from which each car is scheduled. All subsequent forms, for distribution to other departments, are made from the original punched card.

Stations in the plant each average 20 carriers daily. Any carrier reaches the most distant station in less than two minutes. Average walking time along the most heavily traveled routes would be about 20 minutes. The high speed system allows paperwork to be distributed as it is completed, leveling the work load throughout the day.

A spot check shows the amount of traffic involved in sending the forms via the carrier system to the different departments. For instance, Station E-1, located in the General Accounting department sends about 20 carriers a day to other departments such as Teletype, Traffic, Billings, Export, Cashier and General Stores. Station E-3, located in Cost Accounting, also sends about 20 carriers a day to Production Control, General Accounting, Export and New Car Checkout.

At the New Car Checkout station, cars are checked against the order to insure that the equipment, color, etc., fulfills the order.

Located some distance from the main building, the check-out station is one of the busiest in the system and dispatches as many as 100 carriers each day. Completed orders are returned to the main building when the new cars leave the yard.

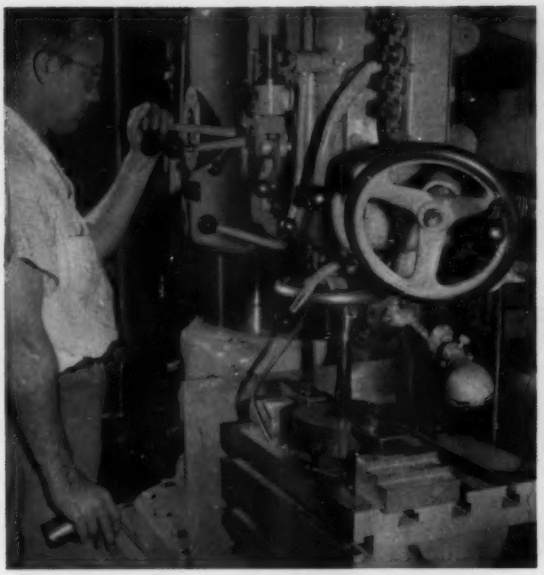


Fig. 1. Initial step in boring an arbor hole on radial drill

Fig. 2.. Cutter-grinder was adapted to grind helical face

Departments Design, Fabricate Cutters

Three Heads Are Better Than One at Douglas

WHEN A SHORTAGE of cutters for a 308-ft Farnham Long Mill developed at the Torrance plant of Douglas Aircraft Company, Inc., three departments cooperated to maintain production schedules. The design of the cutter was a joint project of the professional tool group from the tool department and carbide specialists from the plant engineering department. Actual fabrication of the cutters and much of the necessary fixture work, was carried out by perishable tool maintenance, a sub-division of the plant engineering department.

Because of the critical need for the cutters, the work was undertaken at full speed, the usual paper work being allowed to catch up as best it could. Changes in design or fabrication were placed in the "quick fix" category, which allowed them to be made immediately their need was established. Through the use of standard machines such as radial drills, lathes, mills and grinders, the cutters were fabricated quickly and cheaply, and without the expense of purchasing new and complex machinery.

Since this project was started two years ago, more than 3500 cutters have been produced under these conditions. The types include two-flute; four-flute; open and closed angle cutters; staggered tooth, forward and reverse cutters; two and three piece cutters; special end mills; shell mill cutters; and inserted tooth cutters. Cutters for standard operations are usually made in triplicate—one for the mill, one for the grinding room, and one to be held in reserve.

After cutter design was established, a scale model was built for test purposes. The tests were successful and an 8-in. spar cap cutter was made. This cutter was placed in competition with standard cutters and tests showed that it used a minimum of 10 per cent less horsepower than conventional cutters and produced a finer finish.

Fabrication of a typical cutter begins by torch-cutting the body on an Oxygraph machine, using a 1/16-in. steel template. This eliminates excessive lathe and mill work. The body is then normalized to relieve the hard condition that frequently follows the torch-cutting of forms. After normalizing, the blank is drilled on a radial drill through special fixtures for the arbor and attachment bolts. The latter are on a conventional pattern common to all bodies of one size.

After forming to correct diameter and width on lathes, the blanks go to the mill line, where they are completely machined on special, indexed, holding fixtures.

Since it had been established that the use of helical blades improved the finish of spar surfaces, thus eliminating considerable deburring, the faces of the cutters are helically ground to provide a constant rake angle in relation to the center line of the cutter.

An obstacle in creating a helical face had been the difficulty in grinding on standard grinders, owing to the need for accurate spacing. This problem was overcome with a device consisting of a guide wheel attached to the work head spindle. The wheel has two dowel pins or spokes inserted into holes drilled at 180 deg intervals. In operation, the spokes slide on an adjustable guide to which is welded a four-inch length of drill rod.

This guide is then clamped to the wheel head of a cutter-grinder. As the work is fed to the diamond wheel, a spiraling action results on the part of the work, giving the desired helical rake.

The work head is designed to enable the operator to tilt the head in an upward or downward position to obtain open or closed angle cutters.

Blending and deburring follow the grinding operation preparatory to brazing on the carbide blades.

Final stage in making the cutters is static and dynamic balancing by electronic means. Following inspection, the cutters are individually boxed and identified, then stored until needed.

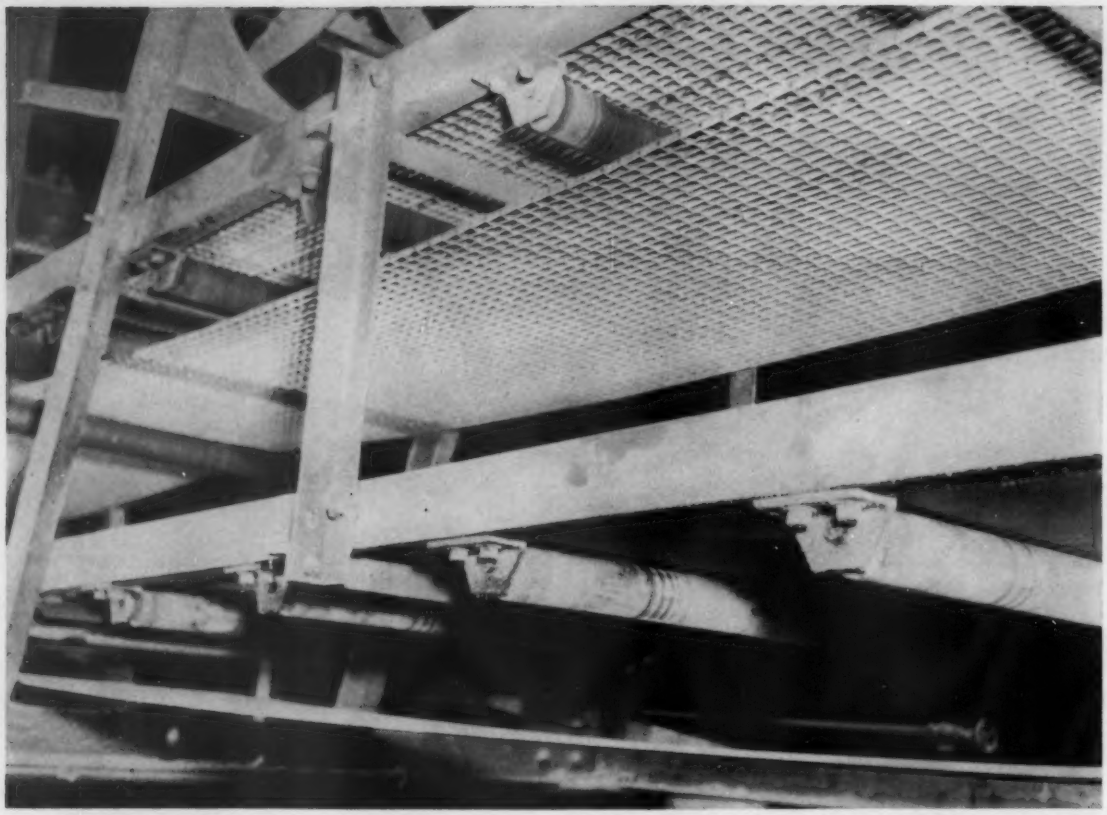


Fig. 1. Constant lubrication of a long line of bearings on this conveyor system was a time-consuming operation. Installation of non-lubricated bearings solved the problem for a rubber firm in New Jersey, by eliminating lubrication

The Case for Non-Lubricated Bearings

How They Act Under High Temperature, Pressure and in Solvents

By B. SILVER, Chief Engineer, Electro-Nite Carbon Co., Philadelphia

IN PRACTICALLY every industrial plant there are a few bearings that are big problems to the plant engineer. They may be in an oven where many lubricants cannot be used because of the intense heat. They may be on a heavy, slow speed machine where an oil film cannot be maintained. Or perhaps they are submerged, and the solution washes away the lubricant.

They might be in an inaccessible spot where they are hard to lubricate and easy to forget, or on a conveyor system where there are so many of them that it would be a full time job for a crew to keep them lubricated.

In all of these cases, and many others, non-lubricated bearings have proved to be the answers to their problems. One non-lubricated bearing, a carbon-graphite bearing, consists of carbon and graphite powders that have been combined under heat and pressure to produce a tough, dense, low friction material. The carbon provides the strength—compressive strengths vary from 12,000 to 35,000 psi—and the graphite, because of its unique crystalline structure, provides the low friction.

These bearings are inert to all chemicals except hot concentrated oxidizing agents. They will not contaminate any process with which they come in contact. Temperatures up to several thousand degrees Fahrenheit have no effect on their properties. They apply a corrosion protective coating to mating surfaces, will not score mating parts, have a low coefficient of thermal expansion and very low mass for high speed applications. Because of these properties and the important fact that the low coefficient of friction comes from the graphite itself, and not from an additive, these bearings are gaining wide usage in industry.

From this information it might be assumed that such bearings are a cure-all. This, of course, is not true. The success of any application of these materials depends upon the unit loading, the surface speed, and to a lesser degree, upon the surface condition, and the material of the mating part. For dry operating conditions, the product of the unit loading in pounds per square inch of projected area and the surface speed in feet per minute should be less than 12,000.

These bearings are operating with unit loads as high as 500 psi at slow speeds, although 50 psi loads are used more frequently. If the bearings are operating submerged in almost any liquid, the PV limit can be multiplied by ten.

The mating materials should be hard and smooth. Ferrous materials are most desirable, although bronze, brass, aluminum and other softer metals have

been used. Usually carbon-graphite bearings should be designed to be press fitted or shrink fitted into a metal housing. They should not be used where they will be subjected to severe shock or vibration.

To illustrate some of these properties, let's examine a few of the applications that plant engineers have found for carbon-graphite journal, slide and thrust bearings.

The Crown Cork and Seal Company, Incorporated, Can Division, uses ovens approximately 80 ft long to dry continuous lines of lithographed beer cans. These cans are carried by endless cables, which pass over spindle type rollers that rotate in grooves in bronze hangers. Since the high temperature destroyed the lubricating value of the grease very quickly, it was necessary to shut down the ovens to relubricate the spindles once a week. Despite this constant maintenance, the grooves in the hangers were worn out in about three months. Consequently, the hangers were made with six grooves so that the spindle could be moved to the next groove when one was worn.

To eliminate shut downs for lubrication, the bronze hangers were replaced with carbon-graphite hangers like the bronze ones, except only two grooves were used. Not only did the carbon-graphite hangers eliminate the need for lubrication, but also each groove lasted at least three years, so that the hangers have an estimated life of more than six years compared to the one and one-half years for the bronze hangers.

Roller conveyor bearings were a big source of trouble to the plant engineer of a Trenton, New Jersey, rubber company. These bearings were on a chain belt conveyor that carried raw rubber materials to molding machines. The fine chalk powder used in the manufacture of rubber products penetrated the seals of the ball bearings and caused them to bind. To keep the long lines of bearings supplied with fresh grease was a monumental task.

Ball bearings in the rollers were directly replaced with two-piece, self-aligning carbon-graphite bearings. Since that time there has been no binding of the rollers. Lubrication has been completely eliminated and replacement of bearings has been drastically reduced.

A meat packing company in Chicago had the same type of conveyor system. Steam was washing the grease out of their bearings every time they steam-cleaned the line. Again, carbon-graphite bearings solved their problem, because they need no added lubricant and they were unaffected by the steam.

Corn Products Refining Company in Argo, Illinois, uses Rotex Shakers to separate starch from grits by vibrating trays loaded with starch in an eccentric pattern. Cast iron slide bearings were used to support the trays and were lubricated by a pressurized grease system. Continual lubrication is expensive. In addition to this, the tubes carrying the grease to the bearings broke very frequently because of the severe vibration.

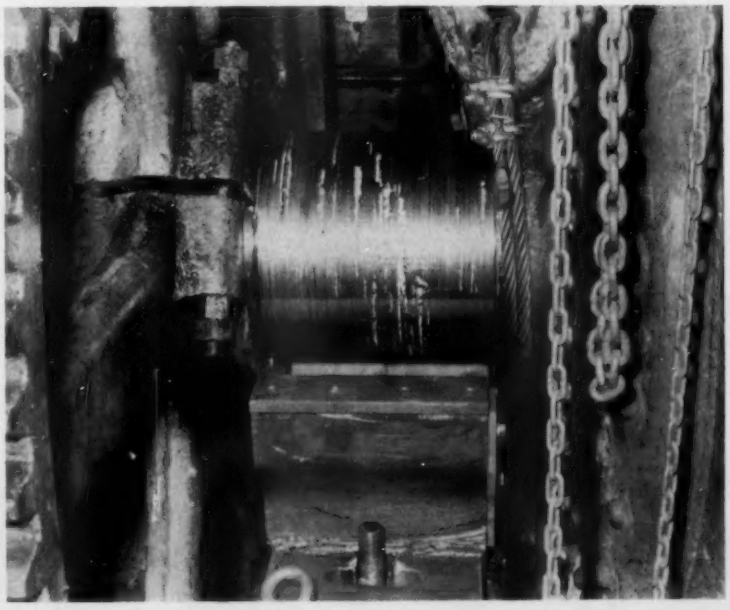
Fig. 2. Corn Products Refining Company uses non-lubricated bearings on this shaker to cut down on maintenance and replacement costs of lubricating lines

These bearings also were replaced with carbon-graphite, and they have been operating over nine months with no lubrication and negligible wear.

An interesting application was uncovered by the Long Island Lighting Company recently where bronze bearings and steel shafts on sump pumps were being scored badly due to dirty, gritty water being pumped. As a re-

(Continued on page 174)

Fig. 3. Riegel Paper Corporation discovered that high pressure, high temperature and slow speed were too much for the journal bearing used on this digester. Photo taken before bearing was replaced with non-lubricated type



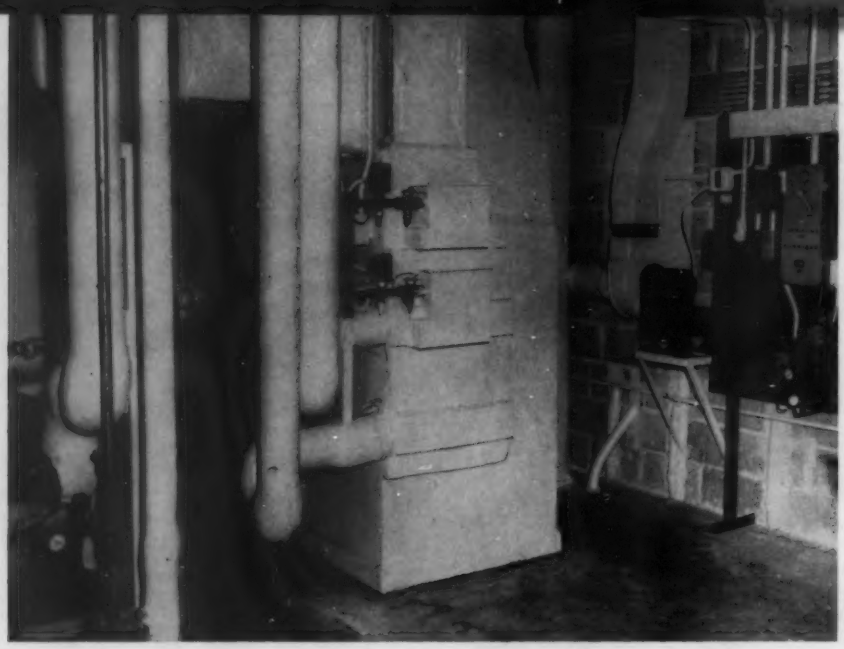


Fig. 1. Humidity conditioning unit is in center of photo. Simple control panel is at right. Specially-trained or licensed personnel is not required to operate this equipment

How A. B. Dick Predicts, Controls Product Performance

It Makes Its Own Bad Climate

By ROBERT HATTIS, Consulting Engineer, Chicago

CHEMICAL TYPE humidity conditioning is helping a pioneer maker of duplicating equipment design its products to withstand the climate wherever they may be used.

A. B. Dick Company of Niles, Ill., uses the process as part of a laboratory testing program by which it is able to simulate conditions of temperature and humidity, then expose the products and find out the effect, if any, of the conditions.

Under all conditions, the equipment must work, day after day, without problems of rust or corrosion in metal parts. The supplies must continue fresh and usable for periods of storage.

The program in general calls for subjecting the products to expectable extremes, rather than attempting to pinpoint all actual climate conditions. Thus, if the product performs well at expectable extremes of hot-moist, and hot-dry conditions and also at comfortable temperature-humidity conditions it will in general perform well at intermediate conditions.

A. B. Dick's research set-up includes three separate testing rooms or cells. In one, standard conditions of temperature and humidity—73 F plus or minus 1 deg, and 50 per cent relative humidity plus or minus 1 per cent—are maintained by refrigeration air conditioning equipment. Here papers are subjected to tests prescribed by the Technical Association of the Paper and Pulp Industry in the necessary constant environment.

In the second, high humidity is maintained by injecting steam into the room to determine the effect of damp conditions of long or short duration on A. B. Dick products, as they are developed.

In the third room, dry climates are simulated with the help of continuous automatic equipment which removes any desired percentage of moisture from the air by chemical means. The humidity conditioning equipment maintains conditions ranging from 60 F dry bulb, 7 gr per lb moisture to 73 F dry bulb, 60 gr per lb.

The "dry" room measures 9 ft by 18 ft, with a 9 ft ceiling, for a content of 1,458 cu ft. The equipment maintaining the required conditions is a Kathabar humidity conditioning unit, which uses a lithium chloride base solution to absorb moisture from the air at a controllable rate.

The unit, made by Surface Combustion Corp., Toledo, Ohio, exposes the air to be conditioned to a flood of the lithium chloride solution in an air washer chamber. The absorption capacity of the solution is a function of its concentration and temperature. The cooler the solution, the more mois-

(Continued on page 178)

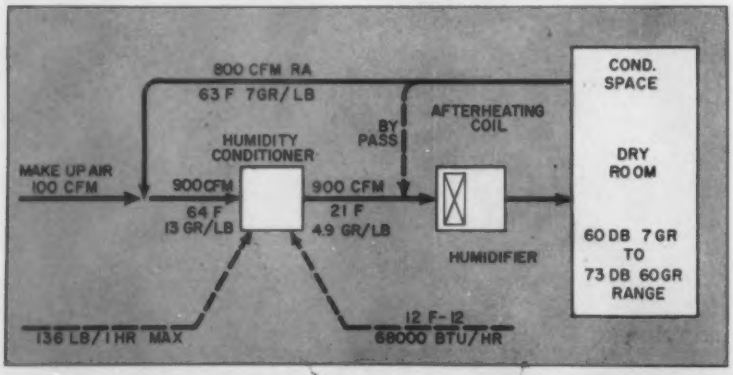


Fig. 2. Flow chart shows chemical type conditioning unit in use at plant

Another Old-Timer "Bites the Dust" as Cardboard Box Replaces Nail Keg

WITH THE INSTALLATION of new materials handling equipment at Joliet, Illinois Works of the American Steel and Wire Div. of U.S. Steel, cardboard cartons are replacing wooden kegs for shipping nails.

Advantages claimed by U. S. Steel officials include: up to 70 per cent reduction in storage space; less breakage; easier identification and handling; and lower freight rates due to reduced ton weight.

A special conveyor system has been installed to handle the containers. Pallets of knocked-down cartons are moved to a semi-automatic machine where an operator stitches each in a matter of seconds.

As each carton reaches the filling machine, a steel sleeve is fitted over it, and it passes under the nail shaker, which tumbles nails into the cartons. The steel sleeve is then removed.

A mechanical conveyor carries filled and covered boxes through a printing machine, which labels the boxes, and a strapping machine which ties up the containers with steel strapping. Finally, a machine stacks the cartons in pallet loads, which are stored for shipment by fork lift trucks.

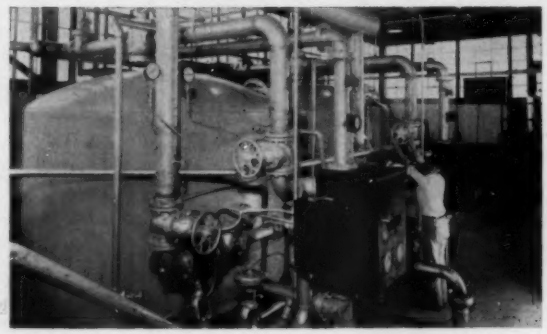
Jet Engines Are Thirsty, So System Gives Them Soft Water During Tests

ONE OF THE MAJOR PROBLEMS of testing jet engines at simulated altitudes is disposing of hot exhaust gases. At the Lewis Flight Propulsion Laboratory, Cleveland, it is necessary to cool the gases from 3500 F to 120 F, to protect the piping, valves and exhauster equipment and to reduce the volume of gas handled.

A recirculating water system of soft water performs this job, as well as two additional ones. Besides cooling the exhaust gases, the water is used to refrigerate and dry the combustion air fed to the test cells, and is used as heat exchange medium in the coolers of the combustion air supply, lubrication equipment and motors.

The tremendous amount of water needed—up to 32,000 gpm—is supplied from a centralized system, the main elements of which are two Amberlite softeners, a 500,000 gal reservoir, deaerator towers and a cooling tower.

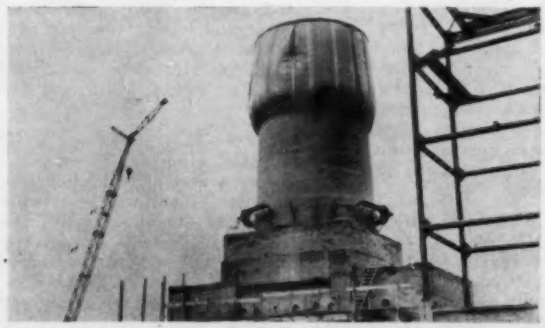
The softeners, engineered by Hungerford & Terry, Inc., each contain 236 cu ft of Amberlite cation exchange resin made by Rohm & Haas Co. Ten feet in diameter and nine feet in overall height, each softener is designed to soften, to virtual zero hardness. 470 gpm of 100-135 ppm water supply.



Operation of the softening system is automatic. Each softener remains on stream, feeding the reservoir until approximately 570,000 gal are softened. When the water meter registers this flow, automatic controls set the softener for backwash and regeneration. No direct labor is required for any part of the process.

Nylon "Parka" on Chimney Helps Bricklayers Beat the Weather

CLOAKING A BRICK CHIMNEY during its construction, using a draw-string "parka," was the technique employed by the M. W. Kellogg Co., when faced with a tight building schedule and a winter season of bad weather.



During the construction period, which extended from January 15 to March 15, there were 26 days of below-freezing temperatures—with a low of 9 F. Rain, sleet or snow fell a total of 18 days, and a severe winter storm occurred, but construction continued on schedule, with the exception of one day lost when wind velocities reached 85 mph.

The neoprene-coated nylon tarpaulin was held against the brick chimney and an interior skeletal framework by drawstrings at top and bottom. Sheltering workmen as well as materials, the parka was moved up the chimney as building progressed. Installation of heating and lighting units inside the tarpaulin enabled the work force to build in relative comfort—in increments of eight to nine feet with each move of the tarpaulin cover.

The job, a 90-ft high quenching chimney, approximately 22 ft in diameter at the bottom and 17 ft at the top, was constructed for National Tube Company's coke plant in Lorain, Ohio.

NEW PLANT CONSTRUCTION — advance information on location, costs

McIntosh, Ala.—The Olin Mathieson Chemical Corp., Mathieson Building, Baltimore, Md., has authorized an expansion program to double production of chlorine and caustic soda at local plant. New plant construction is already under way and is scheduled for completion early in 1957. Expansion will increase plant's capacity to 250 tons of chlorine and 280 tons of caustic soda daily and will represent an outlay when completed of $7.5 million.

Los Angeles, Calif.—The J. A. Folger Coffee Co., Howard and Spear Sts., San Francisco, Calif., has acquired a 10-acre site in the Dominguez section south of Los Angeles on which it plans to construct a manufacturing plant. The new one will handle distribution for central and southern California and southern Nevada and Arizona. Cost of the new project will exceed several million dollars.

Los Angeles, Calif.—The Fruehauf Trailer Co., 10941 Harper Ave., Detroit, Michigan, plans to construct a new 250,000-sq ft manufacturing plant near Ontario, Calif. The plant, the company's third in this area, is to be constructed on a 100-acre site in the Vina Vista industrial sector, 41 miles east of Los Angeles. This will be a multi-million dollar investment.

Puente, Calif.—The Carrier Corp., Carrier Building, Syracuse, New York, plans to expand company facilities on the West Coast. A new plant will be built on a 68-acre site recently acquired 18 miles east of Los Angeles, for production of air conditioning, refrigeration and industrial equipment. Project to cost an estimated $6 million.

Torrance, Calif.—The Reynolds Metals Co., Reynolds Metals Bldg., Richmond, Va., has announced completion of plans for construction of a new aluminum foil plant at local site here. Old building of Pacific Electric Co. will be modernized and altered for the new operation and work is expected to get under way soon. Plant will be capable of producing aluminum foil in widths up to 54 in.

Jacksonville, Fla.—The National Container Corp., 7 Central Park West, New York, N. Y., shipping containers, has acquired a 55-acre tract of land adjacent to present plant facilities where it plans to begin a five year expansion program to double the capacity of its kraft paper mill. When new facilities are completed production capacity is expected to exceed 900 tons daily. Plant will represent an investment of $25 million.

Chicago, Ill.—The Borg-Warner Corp., 310 So. Michigan Ave., Chicago, Ill., has announced a major expansion through 1956 in the amount of $25 million. Most of these funds are already earmarked for plant expansions in three states, including a multi-million dollar research center in Des Plaines, Ill., an electronic plant and laboratory in Santa Ana, Calif., and a $10 million chemical plant in Washington, West Virginia.

Evansville, Ind.—The Aluminum Co. of America, Alcoa Building, Pittsburgh, Pa., will begin construction of a new 150,000-ton aluminum smelting plant on the Ohio River, near here. Facilities will include ingot-casting equipment, a carbon plant for manufacturing anodes, used in the smelting process, machine shops, electrical shops, offices and other service installations. The new plant, Alcoa's eighth aluminum smelter and second to depend on solid fuel, will cost in excess of $80 million.

Evansville, Ind.—The Whirlpool-Seeger Corp., plans a major expansion program at its Evansville Division. Work is already under way on 90,000-sq ft addition to plant No. 2. Approximately $11 million has been allocated for construction, additional machinery and equipment and production facilities at plants No. 1 and 2. Entire project when completed will represent a $19 million investment.

Mason City, Iowa—The Lehigh Portland Cement Co., Allentown, Pa., has authorized a major expansion and improvement program at local cement plant here. Expansion of main plant will increase productive capacity of the mill by better than 1,000,000 bbl per year. Cost of expansion and improvements to total $12 million. Walsh Construction Co., Davenport, Iowa, is in charge of construction.

Topeka, Kans.—The Goodyear Tire & Rubber Co., 1144 E. Market St., Akron, Ohio, has announced a major expansion program at local plant site. Machinery to manufacture white sidewall tires, a new unit to produce retread rubber and greater facilities to produce larger output of huge tires for earthmovers will be included in program. New buildings will add 250,000 sq ft of additional production facilities. Cost estimated to exceed $2.5 million, with equipment.

Grand Rapids, Mich.—The Lear Co., Inc., 3171 S. Bundy Drive, Santa Monica, Calif., flight control systems for aircrafts, has plans under consideration for the construction of a new manufacturing plant on 31-acre site near the Kent County Airport. New plant will have a floor area of more than 165,000 sq ft and is reported to cost about $3.5 million.

Fort Crowder, Mo.—The Aerojet-General Corp., Azusa, Calif., plans to construct a new rocket engine plant to produce and test liquid rocket engines. Ground has been broken and construction work will begin at once. Main plant will have a floor area of 200,000 sq ft, and when completed will represent an investment of $9.5 million, including equipment. The Dickman, Pickens and Bond Construction Co., Little Rock, Ark., has been awarded the construction contract.

Delair, N. J.—The Ford Motor Co., Dearborn, Mich., has acquired a 38-acre tract of land near here and plans to construct a large office building, parts depot and export facility. Plant scheduled for completion in 1957 will take over parts and accessories inventories and export operations now in operation at the Ford assembly plant at Chester, Pa., about 20 miles distant.

Franklin, N. J.—Hewitt-Robins, Inc., 664 Glenbrook Road, Stamford, Conn., recently acquired a 10-acre site here and plans to construct a new plant for the manufacture of polyurethane foam, a sponge-like plastic expected to find a wide market as a cushioning and insulating material. The new plant will have a floor area of 100,000 sq ft, and will represent an investment, when completed, in excess of $1 million.

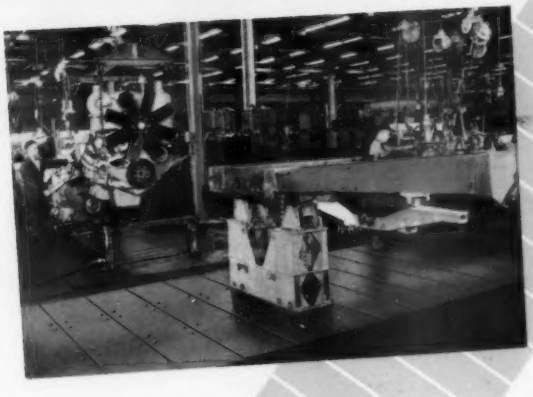
Fayetteville, N. C.—The Borden Co., Chemical Div., 350 Madison Ave., New York, N. Y., plans to construct a new plant for the manufacture of formaldehyde and synthetic resin. New plant, of steel and concrete, will be located on the banks of the Cape Fear River and will be completely automatic. Plant is expected to produce 36 million lb of formaldehyde annually.

Dayton, Ohio—The Lau Blower Co. has announced plans for a major company expansion of plant facilities and equipment to exceed $2 million. Plans include a 56,000-sq ft addition to the Dayton plant and a 34,000-sq ft addition to the plant in Azusa, Calif. More than $1 million will be earmarked for production tools and related equipment to meet increasing demand for blowers and fans.

Houseville, Pa.—The United States Steel Corp., 71 Broadway, New York, N. Y., has authorized plans and work will begin at once on construction of new iron ore sintering plant here. The plant, composed of three sintering units will process about 15,000 tons of domestic and foreign ores per day, for corporation's steel plants at Duquesne, Marion, Homestead and Braddock, Pa. Cost expected to exceed $30 million.

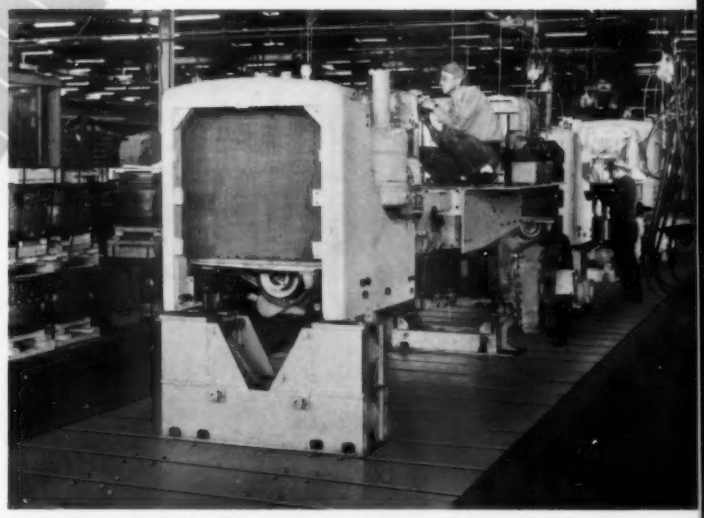
Bryan, Texas—The Texas Glass Manufacturing Co., Houston, Texas, plans to construct a new glass manufacturing plant here. Plant will be capable of producing 83 tons of finished glass daily. New facility will be devoted to the manufacture of single strength, double strength and sheet crystal glass. Plant when completed will represent an expenditure of $1.8 million.

For more facts circle 563 on Reply Card——→

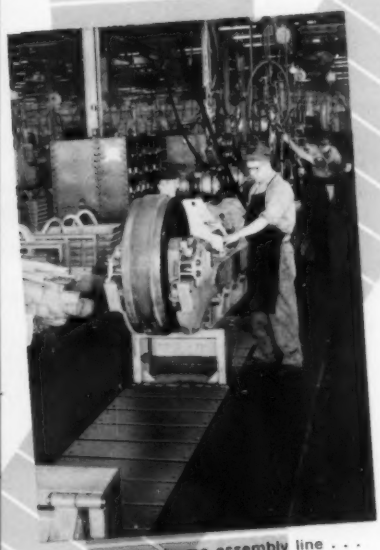


Engine feeder line . . . completely assembled engine being transferred to final assembly line.

Conveyors Carry 40,000 pound Caterpillar-built Tractors



Tractor at end of assembly line . . . ready for roller frame assemblies and tracks.



Track roller frame assembly line . . . unit in foreground is ready for assembling to tractor.

To obtain maximum production of the world's largest track-type tractors, Caterpillar Tractor Co. has installed in its Peoria plant a system of Webb slat conveyors that serves as assembly lines. The main assembly line, which is a slat conveyor 9 feet wide and over 320 feet long, is one of the largest conveyors of this type in the world. Tractors assembled on this conveyor line average approximately 40,000 lbs. each.

Three other slat conveyors, also flush-floor-mounted, complete the tractor assembly system. One conveyor is used for feeding engines to the main line and the other two for assembling track roller frames. Each of the four conveyors is installed and fixtured to automatically carry the assemblies from one operation to another and keep work at the most convenient height.

Large and small industries throughout the world, for over 35 years, have been using Webb engineering skill, manufacturing experience and installation ability to solve every type of materials handling job. We will welcome an opportunity to discuss your needs or problems.

WRITE FOR:

Catalog 50 . . Trolley Conveyors
Catalog 51 . . Floor Conveyors
Catalog 52 . . Power & Free Conveyors

JERVIS B. WEBB CO.

Specialists in Custom Conveyor Systems

8933 ALPINE AVENUE • DETROIT 4, MICHIGAN

FACTORIES: DETROIT • ATLANTA • LOS ANGELES • HAMILTON, ONTARIO, CANADA • ENGLAND • FRANCE • AUSTRALIA

Lighting by DAY-BRITE Lighting Fixtures makes the big difference...

G. R. Kinney Co., Inc., Shimerstown, Pa., shoe dispersal center, with Day-Brite CFI (Comfort For Industry) fixtures.

Lower distribution costs... with Day-Brite CFI

In many industrial areas, a combination of quality and quantity lighting is essential to reducing errors and making man-hours most productive. That's why Day-Brite CFI (*Comfort For Industry*) fixtures were chosen for the distribution-area pictured above.

Note how the ideal quantity and quality of overall illumination is provided—how *upward lighting* washes out harsh ceiling contrasts—thus minimizing fatigue and the possibilities of error. It's a wise investment!

Before you decide on any original or relighting installation, see your Day-Brite representative. He's listed in the phone book. Or, send for CFI Industry Lighting literature.

DAY-BRITE LIGHTING, INC.
5439 Bulwer Ave., St. Louis 7, Missouri

Nation's Largest Manufacturer of Commercial and Industrial Lighting Equipment

DECIDEDLY BETTER DAY-BRITE Lighting Fixtures

61145

For more facts circle 564 on Reply Card

HYDRECO Gear-Type Hydraulic Pump

DUDCO Vane Type Double Pump with Valve Panel

In Your Search for MORE...MORE...MORE—Look to FLUID POWER

More pieces per hour, greater precision, more functions from equipment, more goods to more people faster... these are the areas wherein Fluid Power performs today's miracles in production and distribution. Engineers in The New York Air Brake Company are singularly well equipped with "know-how" and experience to answer YOUR problems.

DUDCO Dual-Vane Hydraulic Pumps and Motors, HYDRECO Gear-type Hydraulic Pumps and Motors, Control Valves and Cylinders run the gamut of Industrial and Mobile Equipment applications... for machine tools; lift trucks; farm and construction equipment; conveyors; oil well, mining or lumbering machinery; for operating winches, cargo booms, hatch covers or steering ships. Name a function on land or sea requiring push, pull, press, raise, lower or rotary motion, and the names DUDCO and HYDRECO are your answer.

In the air—STRATOPOWER Hydraulic Pumps combine amazing weight/horsepower ratios with equally amazing ability to perform dependably at all altitudes and high temperatures.

In Liquid Handling, AURORA Centrifugal and Turbine-type Pumps and KINNEY Heliquad and Rotating Plunger Pumps provide the practical and economical means for moving "anything that will flow through a pipe," from gasoline to asphalt.

KINNEY High Vacuum Pumps, producing pressures down to 0.0001 mm Hg., afford still another important tool to make things better, faster and at lower cost. High vacuum is *the* new technique in many industries.

What are your "MORE" PROBLEMS? Are you fully aware of what The New York Air Brake Company can do to help you solve them?

KALAMAZOO DIVISION

Kalamazoo, Mich.

HYDRECO Gear-Type Hydraulic Pumps, 3 to 120 gpm; Fluid Motors, 3 to 52 hp; Cylinders; Control and Auxiliary Valves; 1500 psi. DUDCO Dual-Vane Hydraulic Pumps, 3 to 120 gpm; Fluid Motors, 7 to 140 hp; 2000 psi operation.

WATERTOWN DIVISION

Watertown, N. Y.

Railroad air brake equipment of all types, STRATOPOWER Hydraulic Pumps for Aircraft, to 3000 psi.

AURORA PUMP DIVISION

Aurora, Ill.

Liquid Handling Pumps, AURORA Centrifugals and APCO deep well Turbines, 7000 gpm, 500 ft. heads. APCO Turbine-type, 150 gpm, 600 ft. heads. Condensate Return Units.

KINNEY MANUFACTURING DIVISION

Boston, Mass.

KINNEY Rotating Plunger and Heliquad Liquid Handling Pumps, to 3000 gpm. Vacuum Pumps, 0.2 micron, evacuate 1800 cfm.

Complete your file of data on new developments in Hydraulic, Liquid Handling and Vacuum Equipment. Write for catalogs today.

THE NEW YORK AIR BRAKE COMPANY

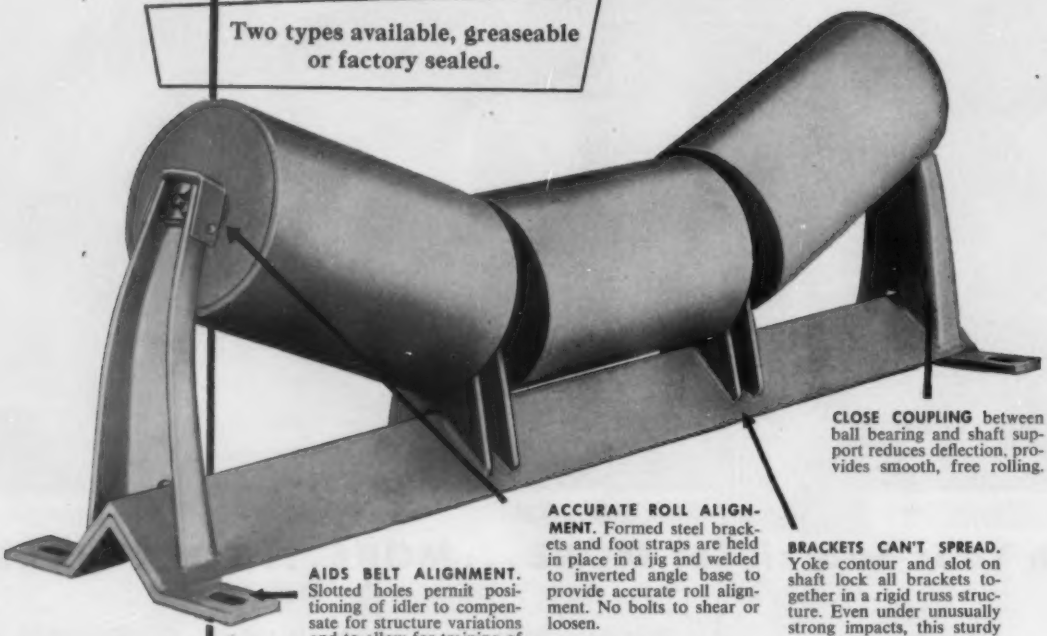
230 PARK AVENUE • NEW YORK 17, N. Y.

INTERNATIONAL SALES OFFICE, 90 WEST ST., NEW YORK 6, N. Y.

For more facts circle 565 on Reply Card

NEW! LINK-BELT Series 50 idler

Two types available, greaseable or factory sealed.

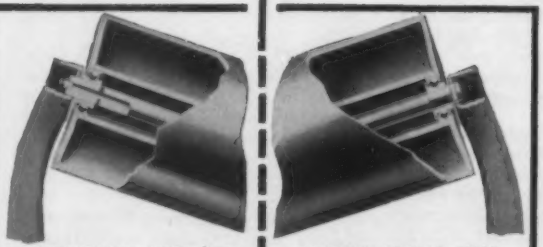


CLOSE COUPLING between ball bearing and shaft support reduces deflection, provides smooth, free rolling.

ACCURATE ROLL ALIGNMENT. Formed steel brackets and foot straps are held in place in a jig and welded to inverted angle base to provide accurate roll alignment. No bolts to shear or loosen.

BRACKETS CAN'T SPREAD. Yoke contour and slot on shaft lock all brackets together in a rigid truss structure. Even under unusually strong impacts, this sturdy arrangement prevents spreading of brackets.

AIDS BELT ALIGNMENT. Slotted holes permit positioning of idler to compensate for structure variations and to allow for training of the belt. Two bolts in each foot strap give greater stability and rigidity.



GREASEABLE TYPE has triple-labyrinth metal seal giving mechanical protection to moving parts while keeping grease in and dirt out.

FACTORY-SEALED TYPE consists of flexible synthetic rubber lip seal bonded to metal backing. No further lubrication is required.

- **Initial and long-lasting economies**
- **Low power requirements**
- **Smooth, free rolling**

HERE's a new idler designed for belt conveyors carrying medium loads or for intermittent operations. It's the new Link-Belt Series 50 which takes its place in industry's most comprehensive belt conveyor idler line.

Backed by Link-Belt's vast engineering and manufacturing knowledge and experience in designing complete belt conveyor systems, the Series 50 is a self-contained, well-balanced unit with bearings fully enclosed and protected. The roll consists of a smooth, uniformly thick outer shell plus a heavy-wall steel center tube brazed to dished steel heads, forming a strong, moisture-proof, integral unit. Ends of the outer shell are counter-bored, and the center tube is journalled concentrically to assure roll alignment.

For data on the Series 50, write for Folder 2516. Your Link-Belt office or authorized stock-carrying distributor will also give you all the facts along with Book 2416 on the complete Link-Belt idler line.

LINK-BELT

BELT CONVEYOR IDLERS

LINK-BELT COMPANY: Executive Offices, Prudential Plaza, Chicago 1. To Serve Industry There Are Link-Belt Plants, Sales Offices, Stock Carrying Factory Branch Stores and Distributors in All Principal Cities. Export Office: New York 7; Canada, Scarboro (Toronto 13); Australia, Marrickville, N.S.W.; South Africa, Springs. Representatives Throughout the World. 14,080

For more facts circle 566 on Reply Card

*Snap-tite

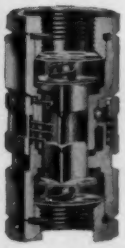
QUICK-CONNECT

QUICK-DISCONNECT COUPLINGS

in larger sizes

immediate delivery
FROM FACTORY STOCKS

Snap-Tite's "H" Couplings are now factory-stocked for quick shipment to you, not only in the smaller sizes (below 1" ID) but in all sizes up to and including 3"—in steel, brass, aluminum, and 303 and 316 **Stainless Steel.** And "H" Couplings can be made to your order, up to 10" ID.



Available with valves to give two-way or one-way automatic line shut-off, or without valves for straight-thru flow, "H" Couplings are built to handle high pressures in hydraulic and air systems.

Recessed valve washers . . . fluted valve stems . . . valve stops with minimum flow restrictions . . . large inside diameter—allow maximum flow capacity with lowest pressure drop.

See the Snap-Tite representative in your city or write for Bulletin 240.

SNAP-TITE'S "H" COUPLING, SIZE FOR SIZE, IS THE SMALLEST COUPLING WITH HIGHEST STRENGTH AND HIGHER EFFICIENCY

*Snap-tite, INC.

UNION CITY 1, PENNSYLVANIA

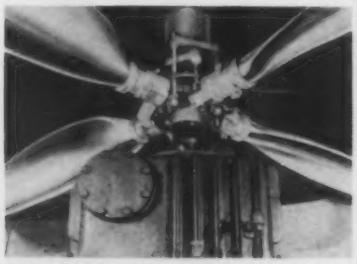
SNAP-TITE COUPLINGS CAN HANDLE ALMOST ANYTHING THAT FLOWS.

NEW PRODUCTS AND PROCESSES summarized for your convenience

Edited by M. E. Heniken

1—FAN, controllable pitch, for heat exchangers

To meet the need for a precise method of maintaining predetermined fluid outlet temperatures, this controllable pitch heat exchanger fan is introduced. Test installations are reported to show ability to hold outlet temperature fluctuation to ±1½ degree F, when used with an adequate temperature sensitive control system, and under many operating conditions, a consumption of 50 per cent less power than that required by most fixed-pitch blade fans. Variable air delivery is accomplished by the variation in blade



pitch setting. The fan assembly is said to respond instantly and automatically to conventional control equipment, increasing blade pitch to deliver more air when outlet temperature rises and decreasing blade pitch and delivering less air when outlet temperature falls. Substantial advantages in operating efficiency and economy are announced for this fan; power load is at a maximum only when the fan is operating at maximum pitch, and the possibility of coil freeze is practically eliminated. Details on the fan are supplied in Bulletin A-113. Hartzell Propeller Fan Co.

Use the Reader Service Cards provided on pages 187-188 to ask for more information on these products. Circle item numbers of products in which you are interested.

3—CIRCUIT BREAKER is 800-amp, molded case unit

This 800-amp M-frame circuit breaker, the Type ET, is announced as the first molded case circuit breaker approved by Underwriters' Laboratories for operation at this continuous current rating. No larger than company's L-frame breaker rated at 600 amp, this new 800-amp breaker can be used in panelboards, power panels, switchboards, motor controls, bus duct plugs and individual enclosures. It offers optional pressure connectors for either double or triple cable connections per phase within the circuit breaker case. Double 300 to 500 mcm cable connectors are available for breakers rated 600 and 700 amp. Triple 300 to 400 mcm or special double 600 to 750 mcm connectors are available on breakers rated 800 amp.

The 3-in. pole-center design dimensions permit accessibility for front cable or rear bus and stud connections. The new 800-amp breaker comes with interchangeable trip units providing continuous 600, 700 or 800 amp ratings in two- or three-pole construction for 250-v d-c and 600-v a-c service. Interrupting ratings are 25,000 amp at 600 v a-c, 35,000 amp at 480 v a-c, 50,000 amp at 240 v a-c and 20,000 amp at 250 v d-c. I-T-E Circuit Breaker Co.

4—METALLIZING GUN needs no compressed air

The Metco Type P ThermoSpray Gun permits the spraying of stainless steel and bronze, it is announced, as well as hard-facing materials and ceramics in powder form, without requiring compressed air. Only a tank of oxygen and one of gas and a few accessories are required. With this equipment a wide range of metallizing work can be done, it is pointed out—build-up with harder and longer-wearing, corrosion-resistant, stainless steel or bronze. Worn pump plungers, motor shafts and many other types of machine parts can be built up and, with the self-fluxing, hard-facing alloys available, hard-surfacing operations can be carried on by the smaller shop, without compressed air. Metallizing Engineering Co., Inc.

5—SAFETY FINISH to brush on plant floors

Purpose of Sono-Grip is to give a low-cost, non-slip finish to wood and concrete floors, steel treads and metal decks. It is claimed resistant to gasoline, oil, grease and many types of acid; and to provide non-slip protection whether the surface is dry, wet or oily. You brush it on like paint and one or two coats will cover any properly prepared surface, according to manufacturer. Sono-Grip contains a fine, sharp aggregate, which gives it the anti-slip qualities. It is also reported to feature unusual elasticity and bonding characteristics, and to adhere well to smooth surfaces. It comes in red, green, yellow and gray. L. Sonneborn Sons, Inc.

2—STUD DRIVER is low cost, powder actuated tool

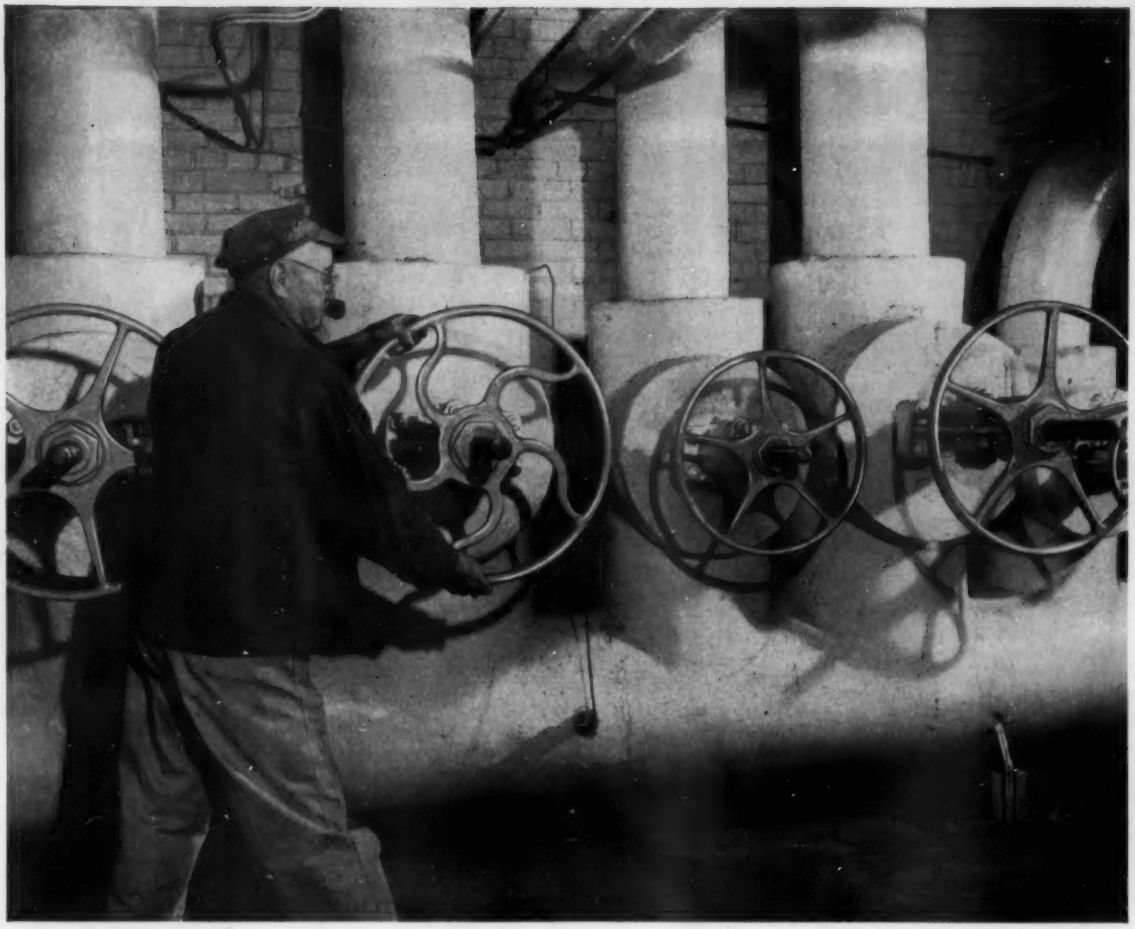
Biggest advantages claimed for the Mighty-Mite Model 456 Stud Driver are low initial cost—less than $35.00—and easy adaptability to jobs calling for low volume fastening output. It is constructed of three simple parts and weighs only 3¾ lbs. After a stud with "Power Guide" disc attached has been placed in the barrel, the operator inserts a 22-caliber power load. When he twists and depresses the tool against the work surface, the firing pin is exposed at the top. A light hammer-blow against the pin fires the tool. Manufacturer says an operator can drive studs at better than one-per-minute rate.

Power loads come in different strength powder charges. Built-in safety is a feature stressed for the Mighty-Mite. It must be held vertical to the work surface before it will fire and must be twisted and depressed against the work before it will operate. Some of the fastening jobs

this tool is suggested for include: duct suspensions; electric motors to concrete; lighting fixtures to concrete and steel; pipe hangers to concrete, steel and brick. Remington Arms Co., Inc.

6—WEED KILLER gets rid of all vegetation

Now available to general industry after several years of use by railroads, Nalco H-174 is a dry, granular material claimed to kill all vegetation. It is intended for use wherever weeds, brush or grasses create a safety hazard or give an unsightly appearance. Shipped and used dry, it is applied at a dosage of 300 to



20-year veterans—all—
with Crane "one-cost" service records

A CASE HISTORY—What better hedge could a power plant have against high maintenance costs?

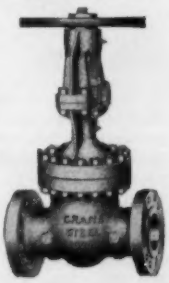
Call it foresight or sound buying practice, the Fort Bend Utilities Co., Sugar Land, Texas, knows the bigger value in quality steel valves. For 20 years now, these Crane 600-pound gates have been operating with no added cost beyond original investment, except for occasional repacking.

The valves are on a main header, with working pressure at 400 psi, 750 deg. F.

As a subsidiary of Imperial Sugar Co., the Fort Bend Utilities plant supplies steam to the neighboring Imperial Sugar refinery through the valve shown being operated. This 8-in. Crane No. 76XR steel gate has to its credit 20 years of faithful once-a-week operation with the refinery's weekend shutdowns. The other valves assure dependable steam control to units in the power plant.

Service records like this result from internal valve quality. They begin with the greater care Crane gives to design, castings, heat treating and machining.

Don't be misled by outside similarity to Crane steel valves. Get the facts from your local Crane Representative or by writing to address below.



CRANE VALVES & FITTINGS

PIPE • KITCHENS • PLUMBING • HEATING

Since 1855—Crane Co., General Offices: Chicago 5, Ill. Branches and Wholesalers Serving All Areas

For more facts circle 568 on Reply Card

NEW PRODUCTS

(Begins on page 130)

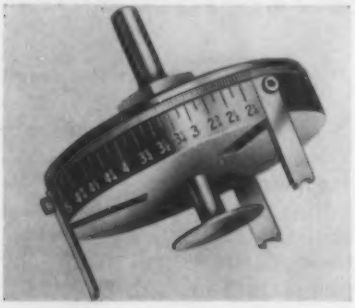
400 lb per acre—considerably less than required of many weed killers. Ordinary fertilizer spreaders or seed sowers are used for application. Manufacturer notes that since Nalco H-174 is virtually dustless, the possibility of chemical drift endangering desirable vegetation near the treated areas is greatly reduced. Nalco H-174 may be applied at any time during the growing season, since it stays in the ground until absorbed by the roots of the weeds. Application early in the season, or before growth starts, is desirable, however, because it kills plants without leaving dead weed debris. National Aluminate Corp.

7—PAINT BOOTH COATING strips off quickly

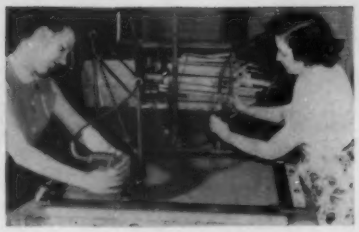
Oakite Shield, a sprayable paint booth coating that strips off in large pieces in seconds, can be applied by spray or brush to dry booth surfaces, and is said to dry fast and cling tightly to vertical surfaces under paint over-spray. When painting has been completed, Oakite Shield film peels off readily with a minimum of prying with a knife and a minimum of shredding. Product is said to have the consistency of paint, to be odorless, non-toxic, and non-hazardous. Respirators are not needed with it, company adds. Oakite Products, Inc.

8—DIAL SAW for wood and metal working

Using the system of dial setting for accurate size, this industrial wood and metal working tool is designed for use with heavy duty equipment. According to manufacturer, it cuts holes quickly and accurately—any size from 2¼ to 5



in. in diam. A turn of the calibrated dial sets high speed steel cutter blades to diameter desired. Made from alloy steel, tool is available in three shank types: Model 500 with ½ in. straight shank, Model 500A with ¾ in. straight shank, and Model 501 with Morse No. 2 taper shank. Each saw is furnished with ½ in. pilot drill and push-out plug, which are interchangeable, and two sets of high-speed steel cutter blades—one for wood cutting, one for metal cutting. Price is about $100. Robertson and Ruth.



9—TOOL MOUNT serves as operator's "third arm"

Radarm is described as a self-balancing tool that maintains constant vertical alignment of air and electric drills, tappers, screwdrivers and other portable tools or operations with a 30-in. radius. Designed with a base which can be attached to a horizontal or vertical surface and can be reversed so that the arm of the mount is suspended from instead of supported by the base, the Radarm can be mounted on walls or columns along conveyorized assembly lines as well as on work benches, and in such a way as to avoid interference with movement of materials. Since it combines a balancing mechanism with the tool mount, it serves to reduce operator fatigue, as well as tool breakage and work spoilage. The mounting device has a self-aligning clamp which adjusts automatically according to contour of the tool. Pneuma-Serve, Inc.

10—JOINT WRAP features high tensile strength

With double the tensile strength of company's former product, Duratape Joint Wrap is a parallel-reinforced glass fiber mat, heavily coated on both sides with plasticized coal tar. It is designed for hand wrapping of field joints and fittings to form a long-lasting, tough barrier against corrosion. According to company, tensile strength has been raised from 29 lb per inch of width to an average of 55 lb. Field tests are said to indicate that this wrap is adequate for any application regardless of how rough the treatment. L. O. F. Glass Fibers Co.

11—FIRE LOCATOR and alarm, serves small plants

Announced as featuring low-cost, low voltage installation wiring as recently approved by the National Fire Protection Association and National Board of Fire Underwriters, is this fire locator and alarm system. It is also available for operation from stand-by batteries in the event of power failure. A fire is located by means of indicator lamps on the control panel. Each lamp indicates a zone, floor, wing or storage area. Audible alarms through the building serve as a warning or evacuation signal to occupants. The system is electrically supervised, it is explained; should a fault occur in the wiring, the trouble bell automatically sounds until the fault is corrected. Both automatic heat detectors and manual stations are used for fire detection. Edwards Co., Inc.

12—WINDOWS filter out the ultraviolet rays

Made of plastic reinforced glass fibers and special ingredients that filter sunlight like a suntan oil, these window panes are for use in buildings storing materials that can be harmed by ultraviolet light. (They are now in use in company's tire warehouse—rubber stocks being subject to deterioration when exposed too long to the ultraviolet rays of the sun.) It is claimed that the panes let up to 50 per cent of the visible light pass through them, but keep out the

ultra-violet rays. To make them, workmen place glass fiber sheets in a mold, add a compound of polyester resin, color pigments and other ingredients, then close the mold and bake the pane.

The panes are installed by usual glazier's methods. While their original price will be higher than that of ordinary glass, they offer long run economy, according to manufacturer. They are declared almost unbreakable and easier to clean than most glass. They are resistant to chemicals, smoke and smog, says company, and since the color is molded into them, they never need repainting. Also, they are said to let in more light than painted glass. Reinforced Plastic Div., The Firestone Tire & Rubber Co.

13—SHADED POLE MOTOR 1/15 to 1/10 hp ratings

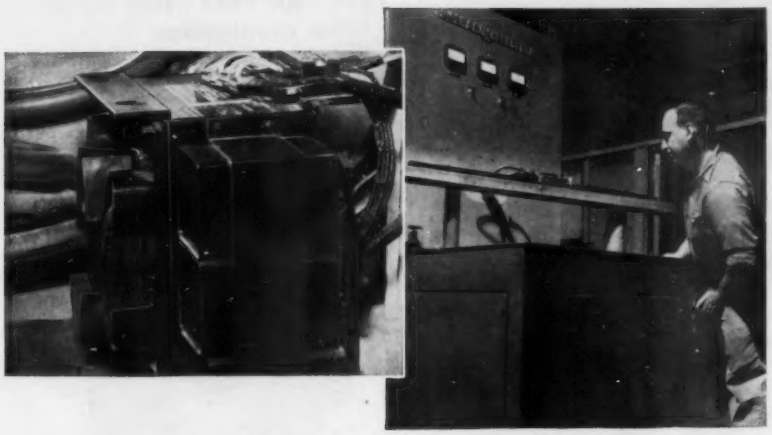
This totally enclosed, shaded pole motor, for high output applications such as ceiling hung gas fired unit heaters, has a "sealed in" lubrication system and is reported to require no reoiling or service under normal use. Available in ratings from 1/15 through 1/10 hp, this 39-frame motor has a 5½-in. diam. A special "oil pump" groove on the motor's shaft serves to provide continuous replacement of cooled, filtered oil on bearing surfaces. Dual oil impervious slingers help to seal in recirculating lubricant, reducing service requirements on motors in hard-to-reach areas. General Electric Co.

14—CONTROL VALVE for erosive or gritty flows

The Sphincter Valve is designed for handling erosive process flows or those containing gritty solids which cannot tolerate pockets but accept Neoprene or natural rubber. It will produce minimum turbulence in the flow through the valve, says manufacturer, and is for use on slurry service where the solids in suspen-

Dry-Type Transformer NEWS

G-E voltage stabilizing transformers featured in new line of electronic induction heaters



G-E voltage stabilizing transformers in new induction heaters assure continuous production.

VOLTAGE CONTROL WITHIN ±3% PERMITS SAVINGS IN MAINTENANCE COSTS

In the design of the Company's new line of electronic induction heaters, G-E engineers considered one fact of primary importance. Fluctuating voltage of just 5% can decrease tube life in electronic induction heaters by as much as 50%. This fact prompted engineers to equip the new induction heater line with field-proven G-E voltage stabilizing transformers. G-E voltage stabilizing transformers hold tube filament voltage to ±3%. Extra-long tube life results to hold down induction heater maintenance costs, and assure continuous heat-treating in metal-working plants.

G.E. Markets New Indoor-Outdoor Dry-type Transformer

G.E.'s Specialty Transformer Department announces the availability of a new extra-quiet, indoor-outdoor 25-kva transformer. Equipped with mounting ears for convenient wall or column mounting, the transformer is specially designed for applications where moisture, dust, lint, are primary factors. Some design features: a phosphatized finish with final coat of G-E Glyptal* alkyd-resin helps prevent rust and corrosion; gaskets between cap and core and between terminal compartments and core are of special weatherproof material; heat is radiated through exposed core, thus eliminating draft through the coils (especially important where corrosive atmospheres are prevalent).

One other point: the new transformer has an unusually low noise level due to vibration-resistant construction. The transformer's low noise level makes it particularly suitable for applications in apartments, offices, hospitals, and in other situations where noise is an important factor. Section 410-22, General Electric Co., Schenectady 5, N. Y.

*Registered trade-mark of the General Electric Company

BUCK-BOOST TRANSFORMERS PERMIT AIR-CONDITIONING OEMS TO STANDARDIZE ON 230-VOLT COMPONENTS

Plenty of interest has been generated in the air-conditioning market by news from G.E. that users and manufacturers can standardize on 230-volt units and still operate from 208-volt distribution systems. Voltage can be boosted from 208 volts to 230 volts with General Electric buck-boost transformers available in ratings to handle any size air-conditioning unit.

Immediate advantage to the user: he can purchase standard 230-volt air conditioners at lower cost than special 208-volt units and match them to his distribution voltage.

Immediate advantage to the manufacturer: he can eliminate dual inventories of 208-volt and 230-volt components.

GENERAL ELECTRIC

For more facts circle 569 on Reply Card

Norgren

MICRO-FOG

Model 33AF-16

Lubro-Control Unit

One lubricator completely lubricates the machine—provides better lubrication—results in quicker, easier maintenance.

THE LATEST ADVANCEMENT IN CENTRALIZED LUBRICATION

. . . for up to 1000 bearing inches*

for

BEARINGS

GEARS

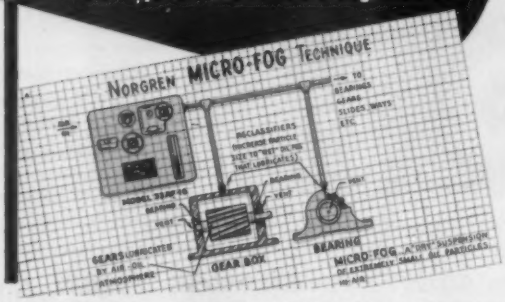
CHAINS

CAMS

SLIDES

WAYS

Other Machine Components



AUTOMATIC MICRO-FOG LUBRICATION—The 33AF-16 Unit automatically creates a finely divided air-borne oil fog which can be uniformly distributed through complex piping systems to multiple lubrication points.

LARGE LUBRICATING CAPACITY—A single unit can completely lubricate even the largest machines — up to 1000 bearing inches.

AUTOMATIC ALARM CONTROLS—Two pressure switches and a float-controlled switch are provided to automatically actuate an alarm system or controls when air pressure fails, when excessive pressure develops in the oil reservoir, or when the oil supply needs replenishing.

COMPACT, COMPLETE UNIT—Although only 12" x 11" x 9" in size, this lubricator contains all necessary controls plus a 2-gallon oil reservoir—enough oil for 12 hours lubrication at maximum MICRO-FOG output.

AUTOMATIC DRAIN FILTER—Protects entire equipment from abrasive and corrosive air line contaminants. Drains collected liquids automatically.

PRESSURE REGULATOR—Accurately regulates air pressure for most efficient lubrication.

VISUAL OIL FEED—Oil feed dome on front of unit provides a quick visual indication of proper operation of lubricator.

TWO AIR SUPPLY INLETS—Both are ½". One is at left side, one in back of unit. The most convenient inlet can be used, the other plugged.

FOUR MICRO-FOG OUTLETS—Three outlets are 1¼", one is 2" with a female tapered thread. One or more may be used.

AUXILIARY AIR TAKE-OFF—A ⅛" take-off is provided in top of unit to supply air for pressure jet reclassifiers if required.

SOLENOID VALVE—Coordinates operation of the lubricator with starting and stopping of machine.

TWO ELECTRICAL INLETS—For ¾" conduit — conveniently located at left end and at back of unit lead to splash-proof terminal compartment. Either or both may be used.

Norgren CO

3443 So. Elati St., Englewood, Colo.

*For complete data on Norgren MICRO-FOG 33AF-16 Lubro-Control Unit, call your nearby Norgren Representative listed in your telephone directory—or WRITE THE FACTORY FOR BULLETIN 531.

Wherever Air is Used in Industry

For more facts circle 570 on Reply Card

NEW PRODUCTS

(Begins on page 130)

sion tend to plug most control valves. Only parts exposed to wear in this valve are a rubber seat and an O-ring. The former is compressed along its axis to produce throttling action and tight closure. At present, ⅜- and ¼-in. OD tubing sizes are available. Parts exposed to process may be bronze, steel or stainless steel. Manual or air operators are available. George W. Dahl Co., Inc.

15—STEAM TRAP needs almost no maintenance

Slightly larger than a 50-cent coin, new ⅜ in. Thermodynamic TD Steam Trap is described as well suited for applications such as tracer lines. The trap is re-

ported to withstand water-hammer and corrosive condensate and operate equally well on light or heavy loads and against back pressures up to 50 per cent of inlet pressure. Practically no maintenance is required for this steam trap, company points out, which has only one operating part, a solid, hardened stainless steel disc. Cap, valve disc and body are of stainless steel. (TD Trap also comes in ½, ¾ and 1 in. sizes.) Bulletin 257B offers more information. Sarco Co., Inc.

16—SCREWDRIVER features a swivel handle

Tru-Driver is described as a fast action screwdriver featuring a swivel handle and a U-bend in the shaft, so that it can be manipulated with a mere twist of the wrist. According to company, screwdriver is ideal for the small assembly line. In addition, Tru-Driver can be carried anywhere. Another feature announced is a no-slip tip that grips screw while you turn, lets go when you stop. Tool is available for slot or recessed head screws. The Mayville Mfg. Co.

17—COLD COMPOUND repairs galvanized surfaces

Drygalv is announced as a cold galvanizing compound for preventing rust, protecting iron and steel surfaces, and repairing damaged galvanizing. The product, which is applied like paint with brush or spray gun, produces a coating

New Alcoa book tells how, where, why to use Aluminum Pipe and Fittings

ALCOA Aluminum Pipe is being used in more applications—solving more and more problems than ever before. That's because ALCOA Aluminum Pipe offers three important advantages: (1) Its low price makes it the least expensive material to use for special-purpose piping; (2) Its lightness makes it ideally suited for quick, economical installation; (3) Its durability keeps maintenance and replacement costs at rock bottom.

The complete story is in this new ALCOA book. Filled with useful illustrations and charts, it gives all the facts on the latest uses of ALCOA Aluminum Pipe and Fittings for:

PROCESS PIPING APPLICATIONS for carrying fluids in chemical and petroleum plants, food processing plants, and many others.

PIPELINE APPLICATIONS for carrying oil and gas; for mine drainage and similar applications.

PORTABLE PIPING APPLICATIONS for supply or disposal lines that handle water, steam, compressed air, fuel and other commodities in such operations as construction, oil well drilling and mining.

STRUCTURAL PIPING APPLICATIONS for use as railings, fence posts, playground equipment, storage racks and scaffolds, and other outdoor uses.

All this plus detailed information on fittings and flanges, valves, installation procedures, and eight helpful tables to aid you in selecting the *right* ALCOA Aluminum Pipe for your need.

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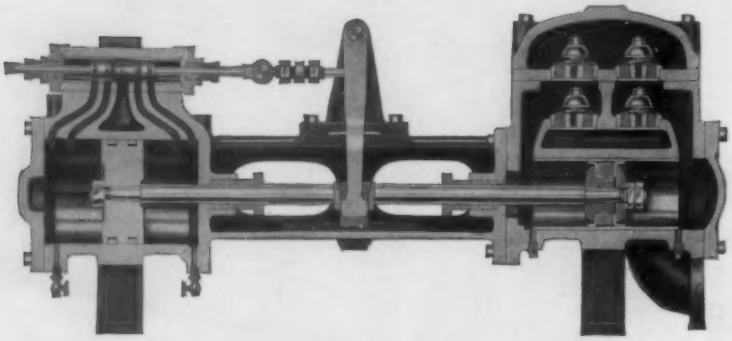
95% Pumping Cost...

"For FREE"

Via WARREN "Realwear" Horizontal Duplex Steam Pump with Piston Valve Steam Chest

featuring special steam piston ring and steam chest piston valve ring construction, in addition to balanced steam chest piston valves and graphitic iron liners.



NOTE THESE ADVANTAGES:

- Oil-free exhaust steam.
- Clean exhaust steam for any purpose
- Protection of boilers.
- No contamination of returns.
- Economy . . . 95% recovery of fuel cost when exhaust steam utilized.
- Reliability . . . not dependent upon electricity.
- Flexibility to meet varying load conditions with efficiency at all points.
- Adaptability to either manual or governor control and to long periods of shut-down, if necessary, without addition of oil or graphite.
- Elimination of any type lubricator.
- Outside valve adjustment.

This construction can save you money on Boiler Feed and all Steam Processing applications.

ASK FOR "REALWEAR" BULLETIN

P-32

WARREN QUIMBY PUMPS

WARREN PUMPS

WARREN STEAM PUMP COMPANY, INC.

Warren, Massachusetts

For more facts circle 572 on Reply Card

NEW PRODUCTS

(Begins on page 130)

with a high proportion of metallic zinc (about 95 per cent in the dried film), according to manufacturer, and this coating affords the same protection as galvanizing. Drygalv is reported nontoxic; it dries to the touch in 15 to 30 min, can be second coated or painted in 8 hr. Company points out that it will withstand temperatures up to 392 F for a limited time, so it can be used in manufacturing processes where high temperatures are necessary. American Solder and Flux Co.

18—STAND-BY PLANT supplies propane gas

This package plant is a portable unit for supplying propane gas for heat treating, gas cutting and other uses, when city or natural gas is cut off. Vaporizer, tank and controls are mounted on heavy skids. Provision has been made so that the unit can be quickly substituted for the main source of gas. Submerged Combustion Co. of America, Inc.

19—BRONZE GATE VALVES of cylindrical design

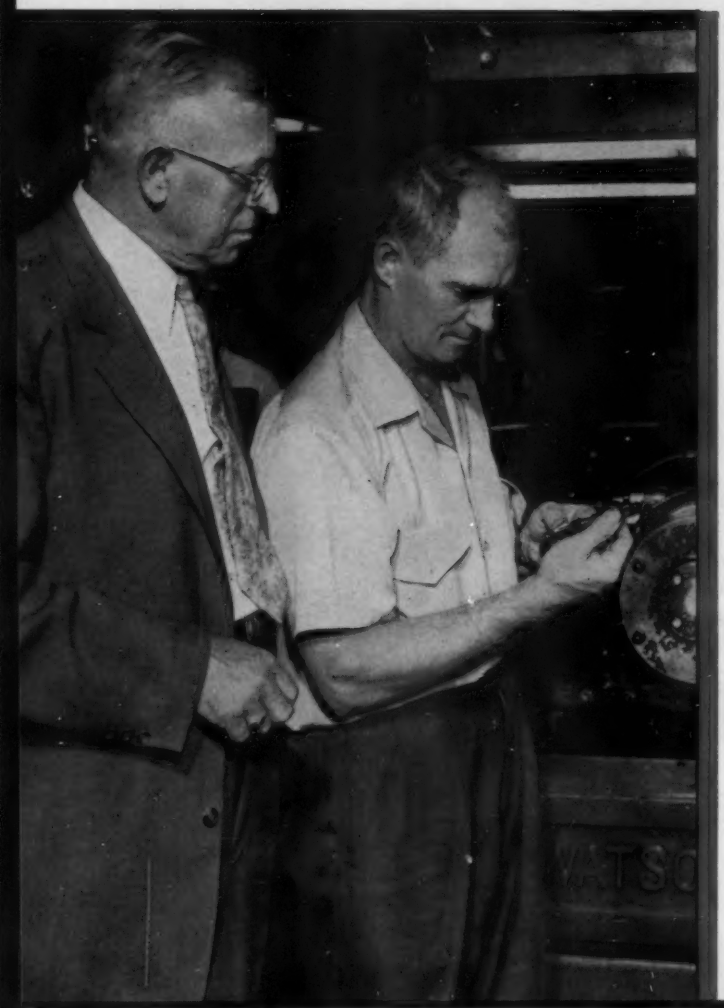
These 125-lb bronze gate valves for steam, water, oil or gas, are available in screwed, solder joint and brazing socket ends. Sizes are from ¼ through 3 in. Greater body strength and longer leakproof valve life are attributed to the cylindrical body construction of these valves. Other features announced are a pistol-grip handwheel combining a firm, three-way grip; an impregnated plastic packing material offering resiliency and longer resistance to leaking; heavy pipe-end hexes for strength; and extra weight for durability. Kennedy Valve Mfg. Co.

More information on any of these products can be yours without cost or obligation. Just circle the item numbers on the Reader Service Cards provided on pages 187-188.

20—CHEMICAL PACKING has high corrosion resistance

The newly developed fiber used in this company's 405 Mechanical Packing is said to offer greater corrosive resistance and service life. Packing is a braid over braid of glass and Teflon—two of the most inert of fibers. Teflon fibers braided over a core of glass fibers and impregnated with Teflon presents a soft pliable low friction packing, it is said, that is excellent for use on centrifugal as well as reciprocating and static applications. It is reported to give excellent performance under wide environmental conditions of temperature and chemical exposure.

STANOIL *Industrial Oil delivers on tough assignment at Indianapolis Screw Products Corp.*

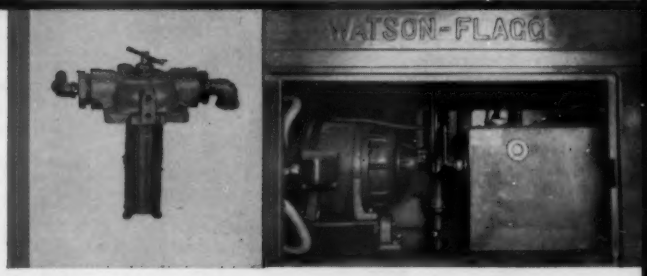


Rolling threads on aluminum bronze with pitch diameter tolerances as close as .0014" is a tough job but Indianapolis Screw Products Corporation is used to taking on such jobs and delivering. They give tough jobs to the hydraulic oil they use, too, and they expect it to deliver. They've given such a job to STANOIL and they're getting the results they expect—and more.

STANOIL Industrial Oil is used in the hydraulic system of a Watson-Flagg precision thread roller in the Indianapolis Screw Products Corporation plant. The system uses a Vickers pump and Cuno filter. The filter has not been cleaned in over a year *because it hasn't needed cleaning.* Here, as in other applications, STANOIL delivers top performance with minimum maintenance and maximum system cleanliness of the hydraulic system.

STANOIL likes tough assignments like this one; likes them because it can deliver with plenty to spare. Perhaps you would like to know about the use of STANOIL in a hydraulic application in your plant. In the Midwest and Rocky Mountain states, a lubrication specialist at your nearby Standard Oil office will be happy to discuss it with you. Call him. Or contact Standard Oil Company, 910 South Michigan Avenue, Chicago 80, Illinois.

Mr. R. W. Williams, Plant Superintendent checks pitch diameter of thread with Glenn Riggs, Standard lubrication specialist. Glenn Riggs is an old hand at helping industrial firms work out lubrication problems. Glenn has been doing this sort of thing for 28 of the 30 years he's been with Standard. This background and experience, customers have found, pay off for them.



Cuno filter (left) remains clean after more than year filtering STANOIL. Vickers pump on Watson-Flagg Thread Roll machine (right). Good housekeeping and STANOIL team to give top performance in this hydraulic system.

STANDARD

STANDARD OIL COMPANY
(Indiana)

For more facts circle 573 on Reply Card

NEW PRODUCTS

(Begins on page 130)

According to manufacturer, concentrated acids such as sulphuric, nitric, sodium hydroxide, aqua regia as well as alkalies, and practically all solvents are easily handled. Abbott & Biddle.

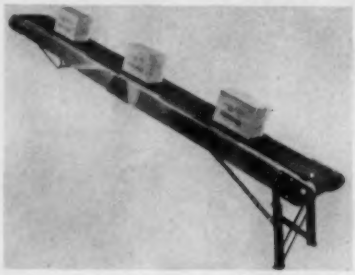
21—TRANSFER SWITCH for emergency power service

For use with emergency power and light systems, the Trans-O-Matic is an automatic transfer switch utilizing mechanically linked circuit breakers as the interrupting element. In capacities to 600 v, 800 amps, with interrupting capacities to 50,000 amps rms, the circuit breaker elements are designed to take inductive inrush currents of incandescent lamps of up to 20 times normal full load ratings.

There are only two possible switch positions: normal closed, emergency open; normal open, emergency closed. No neutral position is possible, according to manufacturer, due to the double-throw design of the interruptor linkage. Trans-O-Matic Switches can be provided with total or partial (phase) failure protection. The former transfers load to emergency source only upon failure in all legs of a single phase, or in all phases of a multiple phase normal source. With this design, return transfer to normal takes place when 70 per cent voltage is restored. Partial protection provides transfer on failure in one leg of a single phase system, in one phase of a multiple phase system. Return transfer is delayed until restoration of 90 per cent voltage in all legs of the single phase, or all phases of the multiple phase system. Lake Shore Electric Corp.

22—BELT CONVEYOR is light and maneuverable

Announced as light but rugged, this belt conveyor is of aluminum truss construction, has a total distributed load capacity of 250 lb. It is 16 in. wide in lengths from 6 to 20 ft. Weight ranges from 145 to 225 lb. The 10-in. wide belt is of three-



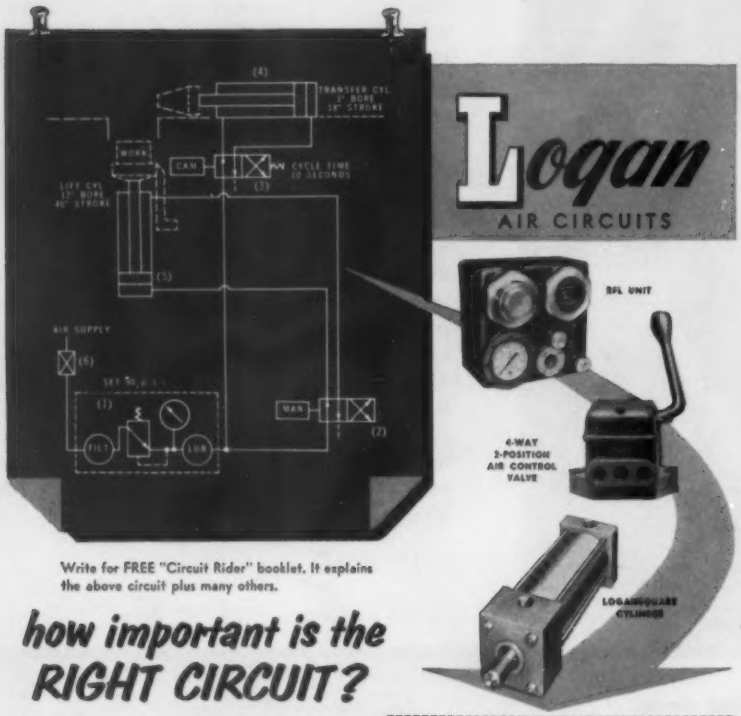
ply duck and moves at the rate of 65 fpm. There is a take-up adjustment at each end, and all moving parts are enclosed. The unit is suggested for use on stairways, as a booster on a gravity conveyor line, stacking, and loading trucks and rail cars. In any inclined position, the belt doesn't touch the floor, making possible minimum loading heights. Units up to 12-ft long are powered by ⅓ hp motors; longer ones are powered by ½ hp motors. In both cases motors are 110/220 v single-phase and a 20-ft cord is supplied. The Colson Corp.

23—GENERATOR produces more steam in less space

This dry land adaptation of company's marine steam generator is claimed to make it possible to obtain 5000 lb steam/hour from an overall floor area of 8 by 7 ft. This can mean 150 hp in less than half the space required for many packaged steam generators. The boiler is designed to modulate over a wide range with high efficiency. It is electronically controlled. Oil pump assembly is furnished factory-installed under the unit. Water treatment tanks are mounted on the side of the boiler shell and piped to feedwater pump system. By-pass piping permits manually controlled water circulation. Cyclotherm.

24—ACID SCALE REMOVER doesn't strip galvanize

Claims for Vapco Scale Remover include a higher rate of attack on scale, even though galvanize is not noticeably attacked after 24 hr of submersion in a 3 per cent aqueous solution at 75 F. Many cleaners or scale removers strip galva-



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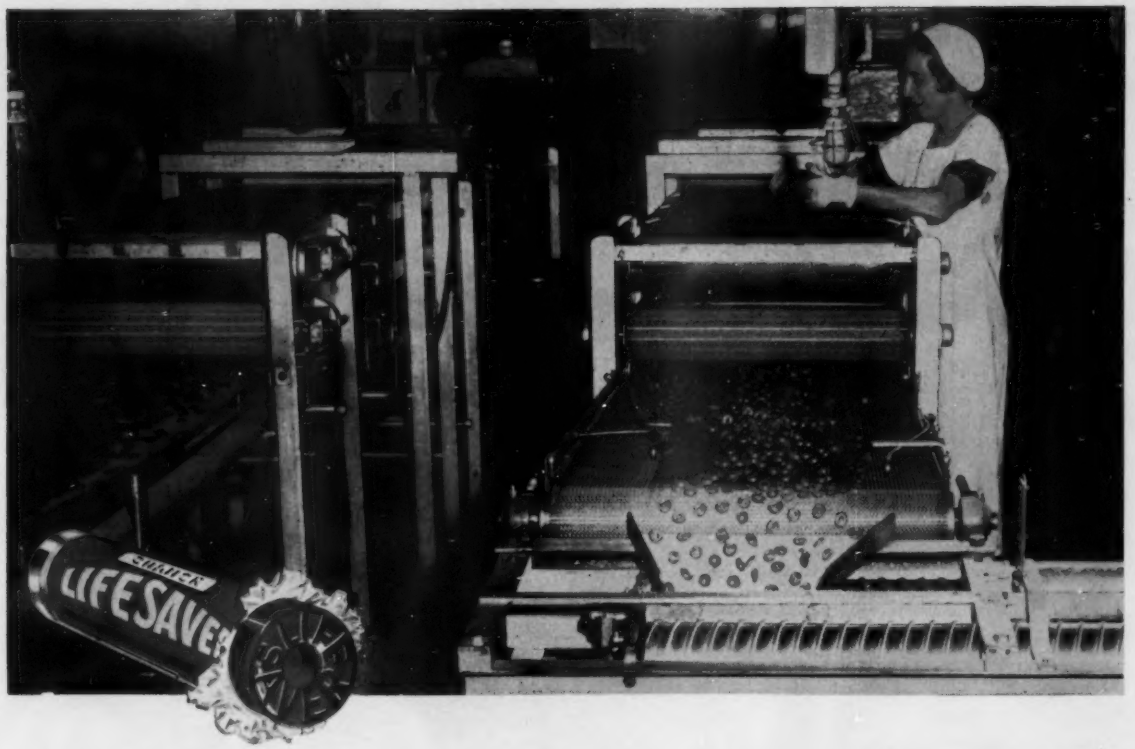

CLARK Type "CY" Starters help Life Savers maintain pre-war price "...still only 5¢!"

Despite raw material and labor cost increases of several hundred percent since 1913, Life Savers Corporation has held the cost of their popular candy package to a nickel. *How?* By increased productivity and increased efficiency in production processes.

Practically all of the control equipment at the company's spotlessly clean, automatic Port Chester plant is by Clark. And, as worn out or outdated equipment is replaced, Clark is chosen. R. D. Farrant, chief electrician, tells one of the reasons why: "Clark starters have everything any other starters have, plus simplicity of changing all parts and ease of maintenance. I particularly like the way the arc shield drops down for easy inspection of contacts."

Write for complete information about the revolutionary Clark Type "CY" starters.

R. D. Farrant, chief electrician, checks installation of 20 Clark Bulletin 6013 Type "CY" size 1 starters on a new panel.

The **CLARK** **CONTROLLER** *Company*

Engineered Electrical Control

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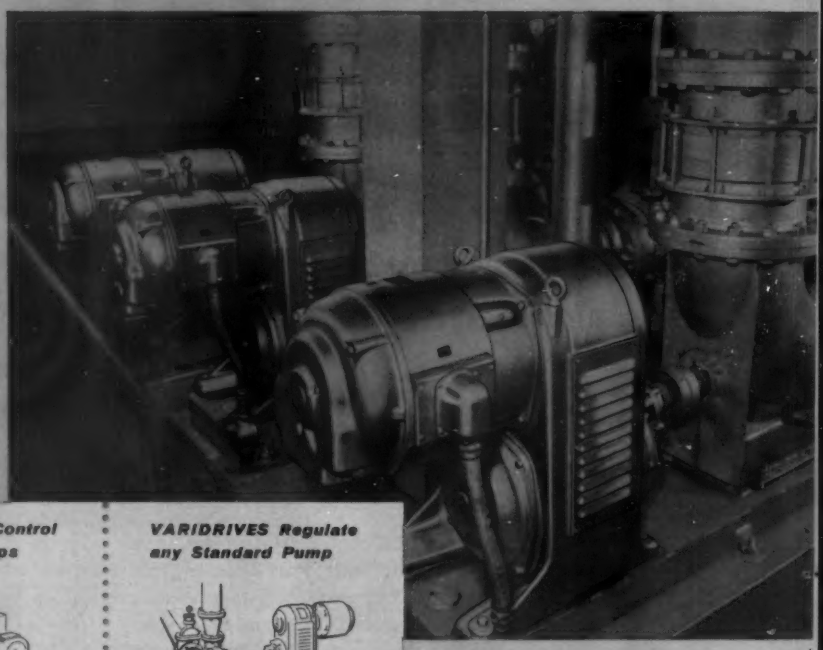
VARIABLE SPEEDS FOR VARYING NEEDS

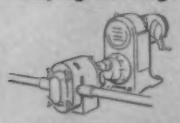
Control Pumping with U.S. VARIDRIVES

Regulating the High and Low of Sewage Flow with U.S. VARIDRIVES

Thirty-two 20 h.p. U. S. Varidrive motors like these shown increase or decrease necessary pumping action of axial flow pumps which transfer sewage at the new Hyperion Sewage Disposal Plant of the City of Los Angeles. This is another example of the versatility of U.S. Varidrive motors to handle variable speed pumping problems in all types of industry. Varidrives are available from ¼ to 60 h.p. Speeds 2 to 10,000 rpm.

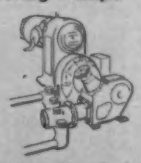


VARIDRIVES Power Pumps used for Pumping Beverages



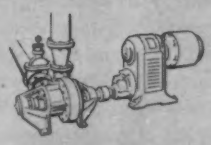
High pressure, low volume rotary positive displacement pumps used in food plants have a variety of uses with the help of variable speed.

VARIDRIVES Control Metering Pumps



Piston type, positive displacement pumps used for proportioning or metering liquids are often regulated by Varidrives.

VARIDRIVES Regulate any Standard Pump



Centrifugal pumps are made more versatile in handling many different pumping conditions with variable-speed drives.

Versatile VARIDRIVE for Additional Applications

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- PACKAGING
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MAIL COUPON NOW

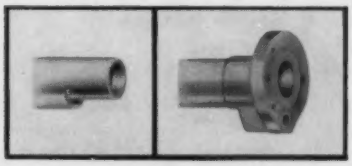
NEW PRODUCTS

(Begins on page 130)

nize in less than 2 hr, and sooner, if heat or higher concentrations are used, it is noted; the rate of attack on zinc or galvanize by Vapco Scale Remover is claimed not materially affected by either heat or higher concentrations. It is explained that since none of the available acid strength in this product is used to remove galvanize, more is available to dissolve scale. Tel-Action pH Indicator Strips are packaged with the Vapco Scale Remover for use in determining when the remover is active; or is mostly neutralized. A sample of the remover is offered. Garman Co., Inc.

25—FLANGE eases joining of steam traced pipe

Offered as a simple and efficient means of joining Unitrace sections is a flange made of alloy A356-T6 and featuring a built-in product and steam tracing line. Unitrace, introduced two years ago, is an integrally extruded steam traced aluminum pipe which permits easy application of heat to product piping. To join two



sections of Unitrace, the trace lines are cut back about 2½ in. from the ends to be joined, and the flanges slipped onto each section end. Unitrace sections and flanges are joined by welding at the front faces and necks of the flanges. Separate gaskets seal product and steam passages between mating flanges. Company states that bolt holes on these flanges mate with standard 150-lb 2-in. ASA pipe flanges and fittings. Condensate drains can be installed by drilling into the steam cavity of the flanges. Main advantage cited for the new system is that it prevents "freezing" of the product in the space between the two Unitrace sections. Aluminum Co. of America.

26—FLOODLIGHTING for the outdoor areas

Called the fluoroflood, this fixture combines features of fluorescent and floodlight units to produce a high level of evenly-distributed light over a wide area. The 8-ft rapid-start lamp generates 7250 initial lumens and offers all-weather illumination at a substantial savings in operating and maintenance costs, according to company engineers. An acrylic plastic cover is available for use with the unit and is recommended for installations in cold climates or during the winter. It protects the lamp from drafts which reduce its light output at low temperatures. Weighing only 7 lb, the fluoroflood is reported easy to install and

KIRK & BLUM

DUST CONTROL SYSTEM

saves power through automatic orifice selection

Top portion of each chute serves as dust control inlet orifice. Dust is removed **before** it can reach batch area.

Each individual dust collection port is designed to be automatically opened by monorail batch car when it stops at particular silo. Closes automatically when car leaves.

COMPANY: The Chas. Taylor Sons, Co., Cincinnati, O., a Subsidiary of National Lead Co., manufacturers of special refractories.

PROBLEM: Dust collecting system for batch mixing area containing 7 silos of refractory grain which feed by chute into monorail batch car as it passes down line.

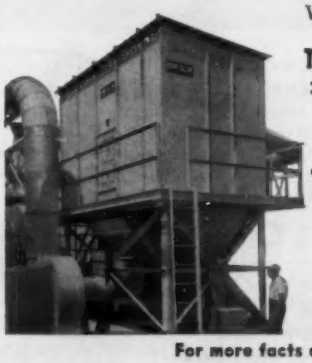
SOLUTION: Kirk & Blum system assures just the right balance to remove light dust without stealing usable product.

Ingenious damper arrangement conserves air, assures highest system efficiency. **No silo dust collection port is open except when its chute is operating.**

Let Kirk & Blum — with 50 years experience — solve your intricate dust collection problems.

Write today for detailed information.

THE KIRK & BLUM MFG. CO.
3189 Forrer St., Cincinnati 9, Ohio



10,000 C.F.M. dust arrestor located outside saves space. Collected dust moves to central disposal point by screw conveyor.

For more facts circle 577 on Reply Card

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an ACCO product

ACCO Registered* Sling Chains

NEW!
Shaped Section Master Link
Holds its form under loads up to 18% greater.
NEW!
Accoloy X-Weld 125 Chain
Welds as strong or stronger than alloy material. Welded area 2¼ times conventional size area.

* Trade Mark Registered

NOW—Better and Safer than Ever!

• ACCO *Registered* Chain Slings—long recognized as the standard of excellence—now give users a double bonus of safety and quality. They incorporate ACCO's new Shaped Section Master Link plus ACCO's sensational Accoloy X-Weld 125 chain.

The new Shaped Section Master Link, without any increase in weight, withstands deformation under loads up to 18% greater than a standard round section can. And the Accoloy X-Weld 125 chain—with its extra-strong, king-size welded area and its non-kinking feature—assures extra ruggedness and better service.

Because of these two spectacular improvements, there is more reason than ever for standardizing on ACCO *Registered* Slings. For additional interesting information, call your ACCO *Registered* Distributor—or write our nearest District Office.

WHAT "ACCO REGISTERED" MEANS . . .

1. The best material
2. Unit safety factor (on bodies, rings, links, hooks)
3. Proof test of complete sling to twice the working load limit
4. Actual field service test of each design
5. Metal identification ring on each sling
6. Signed Registry Certificate with each sling

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York, Pa., Atlanta, Boston, Chicago, Denver, Detroit, Houston, Los Angeles, New York, Philadelphia, Pittsburgh, Portland, Ore., San Francisco, Bridgeport, Conn.

plus Rings Links Hooks

For more facts circle 578 on Reply Card

NEW PRODUCTS

(Begins on page 130)

suitable for parking lots, loading platforms and other areas where a low-cost, short range light source is desired. It is equipped with two telescopic lampholders. Company's 89G646 ballast is included with the fixture—only one ballast is needed for a two-unit fluorofloood installation. General Electric Co.

27—COMBINATION DRIVE for continuous pumping

For installations where continuous or stand-by pumping service is essential, the U. S. Holloshaft Type GPC is a right-angle combination drive available in sizes from 30 to 150 hp and in a wide selection of gear ratios. In normal operation, an electric motor, mounted on the disengaged drive, powers the pump. In the event of a power failure or electric motor breakdown, the drive is then readily engaged to transmit power from a stand-by combustion engine with little lost time. Among features incorporated are a heavy-duty motor stand and rustproof aluminum cover which protects external parts against moisture and corrosion. Bulletins 1775 and 1912 provide full data. U. S. Electrical Motors Inc.

28—SELECTOR VALVE with a variable flow pattern

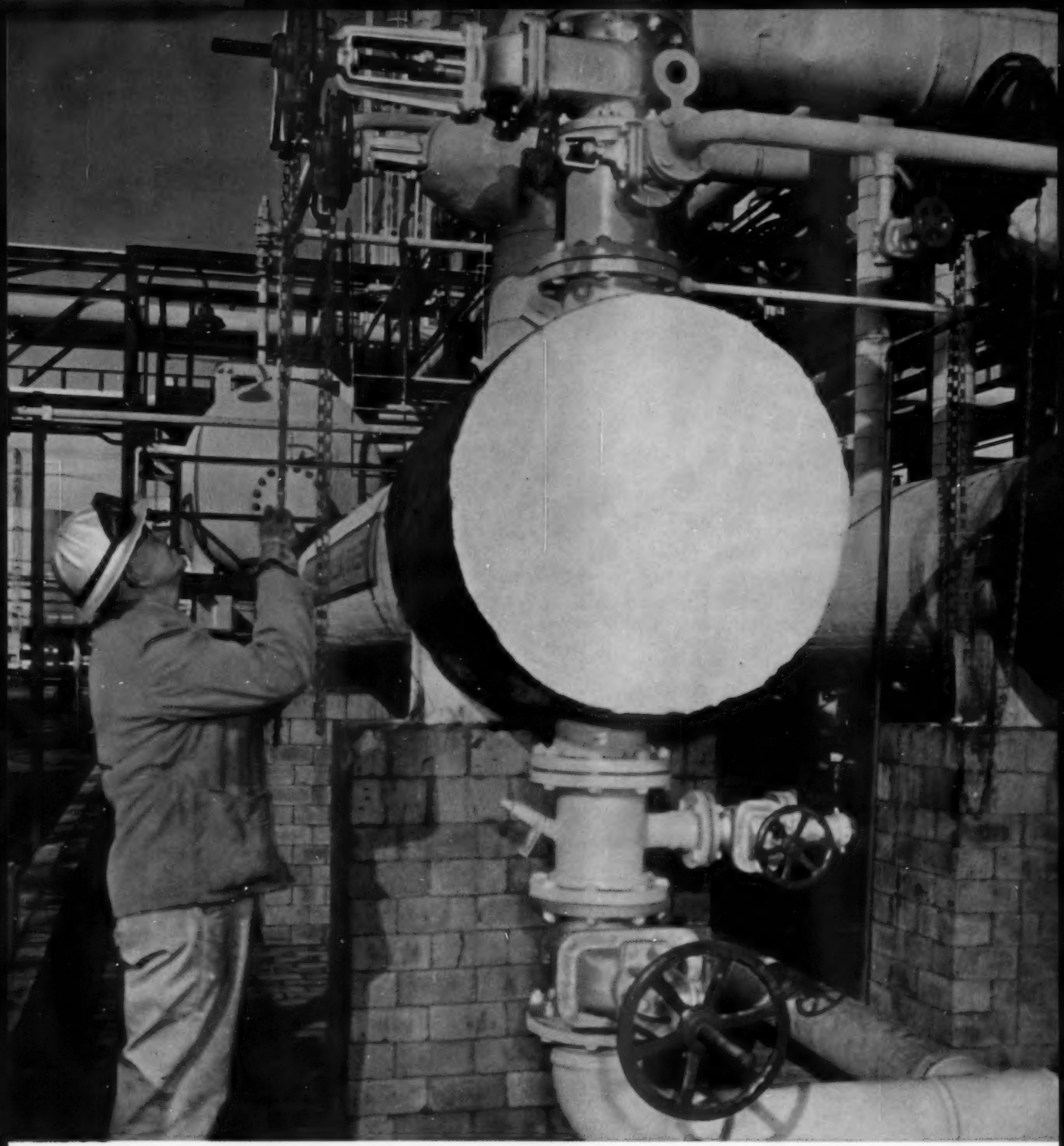
The K-274 is a solenoid operated two-position four-way selector valve which provides flow control of air, oil, gas or

other semi-lubricating fluids at pressures to 600 psi. Outstanding features announced for the valve include variable flow pattern, high speed operation, long service life, packless construction and multipoised design, which permits operation in any position. Valve is suggested for small pressure actuated cylinder control. General Controls.

29—RESURFACER prevents asphalt, concrete corrosion

Goodyear Petroseal is announced as a resurfacing material which prevents weathering and corrosion of asphalt and concrete. Material is a black, non-asphaltic liquid which, when applied over concrete or asphalt, hardens to form a

For more facts circle 579 on Reply Card——→



Closing the gate on hard-to-hold hydrocarbons

At Esso Standard Oil's Bayway Refinery light hydrocarbons are used extensively at a wide range of temperatures and pressures.

Light hydrocarbons are hard to "hold," but the self-adjusting wedge design on Aloyco gate valves insures tight shut-off. Corrosion-resistant Aloyco valves – like the red-wheeled, chain-operated gate valve above – are used throughout many process units.

You'll see many more of them on key jobs at leading petroleum, processing and chemical plants throughout the country. What about your corrosives-handling problems? Write Alloy Steel Products Company, Inc., 1301 West Elizabeth Avenue, Linden, New Jersey.

6.2

Longer Lasting
ALOYCO
VALVES
1ST IN CORROSIVE SERVICE

Subsidiary of Walworth Company

Keep production on the up and up

with powerful, lightweight Keller Tool air hoists

Here's the hoist you can start and stop all day long—without any danger of a burned-out motor to halt production. It's powered by a Keller Tool axial piston air motor that just won't burn out.

Keller Tool air hoists offer other advantages as well, including easily controlled speed—fast for the high lift—creep for accurate load spotting.

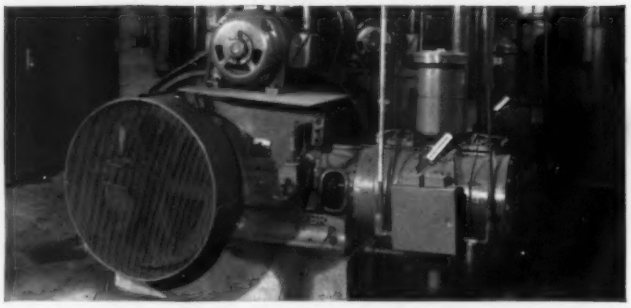
When you need a lift in a dusty room or in a corrosive atmosphere, a Keller hoist will handle the job without unusual maintenance. The enclosed air motor is made for such locations.

Every Keller Tool air hoist is light in weight in relation to its lifting capacity. Simplifies moving and hanging. All sizes furnished with roller chain; some sizes also available with link chain. Check the capacity you need in the table below:

Model	Capacity	Speed	Weight
86-1V3	300 lb.	80 f.p.m.	28 lb.
86-1V5A	500 lb.	35 f.p.m.	28 lb.
86-1V10*	1000 lb.	19 f.p.m.	28 lb.
86-2V10	1000 lb.	35 f.p.m.	78 lb.
86-2V20*	2000 lb.	19 f.p.m.	78 lb.

*Available with link or roller chain

Send today for Bulletin 86.



A popular unit in the compressor room: the Gardner-Denver RX. Capacities from 90 to 1300 cfm. Described in Bulletin HAC-40.

GARDNER - DENVER

KELLER TOOL division, Grand Haven, Michigan

THE QUALITY LEADER IN COMPRESSORS, PUMPS, ROCK DRILLS AND AIR TOOLS FOR CONSTRUCTION, MINING, PETROLEUM AND GENERAL INDUSTRY

For more facts circle 580 on Reply Card

NEW PRODUCTS

(Begins on page 130)

tough, waterproof seal. According to manufacturer, this surface is impervious to corrosive effects of oil, grease, gasoline, salts and acids, and is unaffected by hot sun's rays or frost. It is suggested for use in parking lots, garages, gasoline stations, driveways, airport runways, and on all surfaces subject to moisture or frost damage. Easily applied with squeegee, brush or sprayer, material is furnished ready to apply, and is said to harden overnight. Consolidated Paint and Varnish Corp.

30—PORTABLE ELECTRIC DRILL for maintenance work

Series 300 Portable Electric Drills are designed for rugged maintenance work where one drill must satisfy many needs and for top drilling performances on assembly lines. According to manufacturer, it meets all requirements for torque, speed and chuck size. The eight models in the 300 series are described as ideal for standardization purposes. Three chuck sizes, ¼, ⅜ and ½ in., are available, and interchangeable handles, either pistol grip or enclosed riveter-type, are featured, along with a press-button safety lock on handle near trigger. The Stanley Works.

To receive product data circle item numbers on the handy Reader Service Cards provided on pages 187-188.

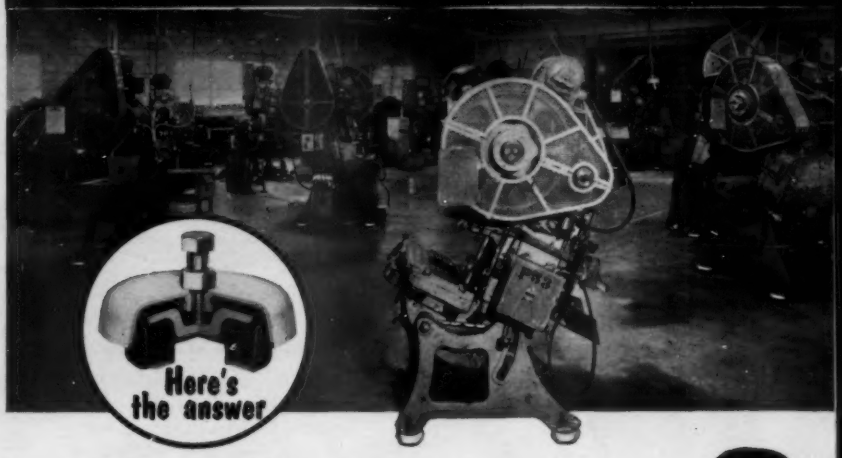
31—V-BELTS are reinforced with steel cable

These steel cable V-belts feature high cable line design, it is announced; they are reinforced with a steel cable to permit carrying heavier loads with smaller sheaves or fewer belts. Strength is increased and stretching negligible, company reports, because of the high tensile strength of the cable. Each cable strand is made of electroplated brass coated steel, with a cumar coating. High cable line design places the entire body of the belt under compression for minimum slippage and wear, according to manufacturer. The belts are suggested for installations where diameters, widths and centers of sheaves are restricted. Durkee-Atwood Co.

32—SEALING COMPOUND prevents thread galling

Slic-Seal, a dispersion with a Teflon base, is announced for use in eliminating galling of pipe threads and to act as a thread sealant. It is claimed completely inert to all known chemicals except molten alkali metals, fluorine at high temperatures and certain complex halogen compounds. Besides its application on

How Biggest Toy Maker of West Cuts Seasonal-Change Costs With Flexible Plant Layout



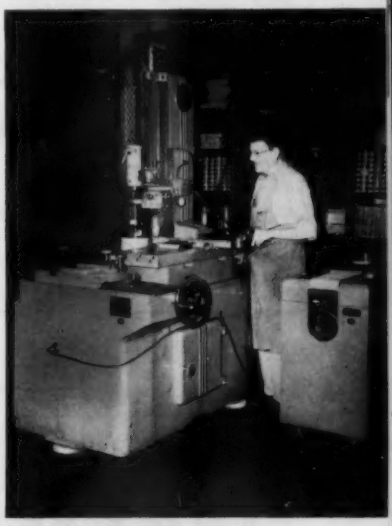
To meet ever-changing production and tooling requirements, Mattel, Inc., uses Leveling Barry Mounts to mobilize its 22 open-back inclinable punch presses ranging from 10- to 60-ton capacity. Now the entire press-room layout is revised whenever the product line changes — because all 22 presses can be relocated in less than a day by three men and an industrial truck. The result — smoother flow of materials, less handling between operations, simplified expansion of press department, easier maintenance, and reduction of noise and vibration transmitted to other parts of the building. Mattel says, "Our Barry Mounts have paid off their investment several times over".

Ask Barry how YOU can boost output by mobilizing machinery.

ATF Proves Barry Mounts Cure Vibration Troubles in Testing Precision Gears

The gages on sensitive gear checkers at American Type Founders went crazy when lift trucks rolled by, and other machines sent vibrations down columns or through walls and floors. But now, with the testers "floating" on Leveling Barry Mounts, gear checking continues without interruption under the worst vibration conditions. For machine tools also, ATF has proved Barry Mounts make it easier to hold close tolerances and to get higher operating speeds by keeping vibration from affecting feeds, cutting tools, or work.

Ask Barry how YOU can protect precision machinery.



Here's How YOU Can Gain These Advantages

Write for our plant survey booklet M-556 that tells you where to look for these kinds of savings in your plant; then talk over your machine-mobility needs and vibration problems with a Barry representative or Barry Mount distributor.

BARRY CONTROLS INCORPORATED

BARRY B MOUNT

SOLD THRU INDUSTRIAL DISTRIBUTORS

910 PLEASANT STREET, WATERTOWN 72, MASSACHUSETTS

For more facts circle 581 on Reply Card

you get EXTRA STRENGTH with versatile

VERSATILE DURAGRIP SLINGS CAN BE USED IN THESE AND MANY OTHER ASSEMBLIES

2 leg bridle

3 leg bridle

4 leg bridle

It's easy to see why Wickwire's Duragrip Wire Rope Slings are becoming so popular throughout industry. They're properly designed and *they are extra safe because Duragrip Splices are used!* This means splices that have 100% of the strength of the rope from which they are made . . . splices that combine the advantages of hand splices and pressed fittings to give double assurance . . . splices free of protruding wire ends which can injure workers' hands.

What's more, there are other reasons why Wickwire Duragrip Slings are so dependable. They're always made from rope and fittings with matched rated capacities . . . made by a company which completely controls its sling production from iron ore through finished sling—your best assurance of the reliability that's so important to sling users.

Next time you need slings, check with your nearby, friendly Wickwire representative. He'll be glad to give you complete details on safe, versatile Duragrip Slings.

3831A

thimble splice with hook

thimble splice

WICKWIRE
WIRE ROPE SLINGS
PRODUCT OF WICKWIRE SPENCER STEEL DIVISION
THE COLORADO FUEL AND IRON CORPORATION

THE COLORADO FUEL AND IRON CORPORATION—Abilene (Tex.) • Casper • Denver • Houston • Odessa (Tex.) • Phoenix
Salt Lake City • Tulsa
PACIFIC COAST DIVISION—Los Angeles • Oakland • Portland • San Francisco • Seattle • Spokane
WICKWIRE SPENCER STEEL DIVISION—Boston • Buffalo • Chattanooga • Chicago • Detroit • Emlenton (Pa.) • New Orleans
New York • Philadelphia

For more facts circle 582 on Reply Card

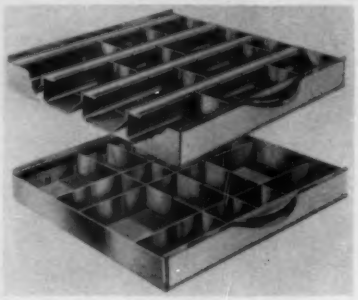
NEW PRODUCTS

(Begins on page 130)

pipe threads, Slic-Seal can also be used in the laboratory to cast a film for capacitor layer insulation and diaphragms, to impregnate porous bearings, to provide a corrosion resistant surface to protect equipment, and to impregnate asbestos fabric and braid for gasket and packing applications. Hoke, Inc.

33—STORAGE CABINETS hold the small parts

Little Gem Cabinets for tiny parts storage are now available in a choice of two drawers. The Type A offers as many as 28 instantly adjustable compartments. Design features include curved compartment surface for easy dispensing, overhang to prevent jumbling of parts, labelholders for identification of parts, and drawer stop to prevent escape of parts or jamming of drawer. A lower priced drawer, the Type B, offers as many as 36 adjustable compartments, has giant labelholder on front of drawer, enclosed bottom and sides and drawer stop. Interchangeable with company's larger drawers, cabinets can be used individually, in stacks, or together, in a variety of multi-drawer units. Equipto.



34—TEMPLATE plots symbols for graphs, curves

No. 59 Plotting Systems Template has cut-outs used in making graphs and sketches and plotting curves. Made of amber colored plastic, the template is 6¾ in. long and costs around $1.00. Rapidesign, Inc.

35—TIME SWITCH provides morning build-up

The improved Weather-Chron is designed to automatically regulate building heating hours and to divide the day into three periods. Two switch circuits are incorporated. The first operates the burner or valve, with only the safety high-limit controlled in the circuit regulating heat generation or flow. Starting time of this morning build-up period changes automatically as outdoor weather changes. At a pre-selected time, the second switch of the timer connects the "daytime" heat flow controller with the circuit to provide a regulated heat flow

Save maintenance dollars—*modernize* your worn-out windows with PC Glass Blocks

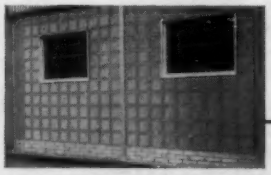
When window sash starts to go, the next step is an "either-or" decision—*either* repair it *or* remove the cause of the trouble.

The discouraging thing about a repair job is that you are only buying temporary relief—not a permanent cure. What you repair is still exposed to the same threats that caused the rusting, rotting and buckling in the first place. So your maintenance dollars are pretty much wasted.

It's an entirely different story when you *remove* the cause of the trouble. And that's where PC Glass Blocks can help you. You see *why* in the main illustration. Take a good, hard look. The worn-out sash has been removed, and glass blocks are being *mortared* into panels. Notice there's nothing to rot, rust or buckle. The result—window areas that are breakage-resistant and maintenance-free.

This is only part of the glass block benefit story. No dirt infiltration, high insulation value, ease of cleaning, better daylighting, and an improved exterior appearance figure in, too.

If the windows in your plant are at that "either-or" stage, you'll find it profitable to get the facts on PC Glass Blocks. For more information, see us in Sweet's, or write for our booklet on window modernization. Pittsburgh Corning Corporation, Dept. PG-76, One Gateway Center, Pittsburgh 22, Pa. In Canada: 57 Bloor Street West, Toronto, Ontario.



PC Glass Blocks mean better light inside—better looks outside

PC Glass Blocks

PITTSBURGH PC CORNING

Also manufacturers of FOAMGLAS® insulation

For more facts circle 583 on Reply Card

CHICAGO TRAMRAIL

TRAK-RAK cuts cost of

BAR STOCK HANDLING 66.3%

employing 2 men where 4 were formerly required . . . with 100% selectivity of material

An improved, simplified, and radically different method of handling bar stock is now in use which replaces the usual difficult and costly method of storing bar stock in pigeon hole racks and removing only a bar or two at a time.

Utilizing the TRAK-RAK Crane System, bar stock is assembled in unit loads placed in containers or baskets which are stored in fabricated tree-type racks on each side of narrow aisles. To remove one or more bars, the container is lowered to the floor, the bars removed and the container with the remaining bar stock placed back in its designated location in the storage racks. The entire movement is one-man, pendant push-button controlled from the floor and it is now possible for the saw man to select his own material and place it directly upon the saw table.

This TRAK-RAK Crane System operates in a 4 ft. 6 in. aisle and stores the material eleven high. The same crane incorporates interchangeable forks which allows the crane to handle palletized material as well as bar stock in the same area.

Write today for TRAK-RAK applications—a 20-page illustrated booklet explaining the TRAK-RAK Handling and Storage System; illustrates and describes installations for handling many diverse materials in fourteen widely different industries.

CHICAGO TRAMRAIL CORPORATION

1324 SO. KOSTNER AVENUE • CHICAGO 23, ILLINOIS

For more facts circle 584 on Reply Card

NEW PRODUCTS

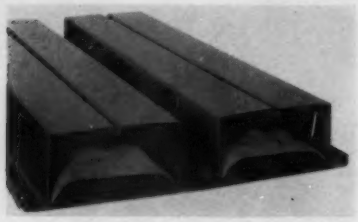
(Begins on page 130)

through the day. Heat flow is stopped, or reduced, at pre-selected night hour.

An added safety feature serves to automatically eliminate "night setback" operation when outdoor temperature drops below a pre-selected safe low level (as 10 F). The unit is designed to stop all heat input to the building when outdoor temperature rises above a pre-selected minimum—as 65 F. One-day or seven-day models are available. Automatic Devices Co., Inc.

36—INSULATION PAD for acoustic panels

An "arched" acoustic insulation pad is introduced for use in this company's lightweight, cellular steel Fenestra Panels and at no extra cost. The pad is made of long, thin glass fibers with a 1-lb density; it gets and retains its density

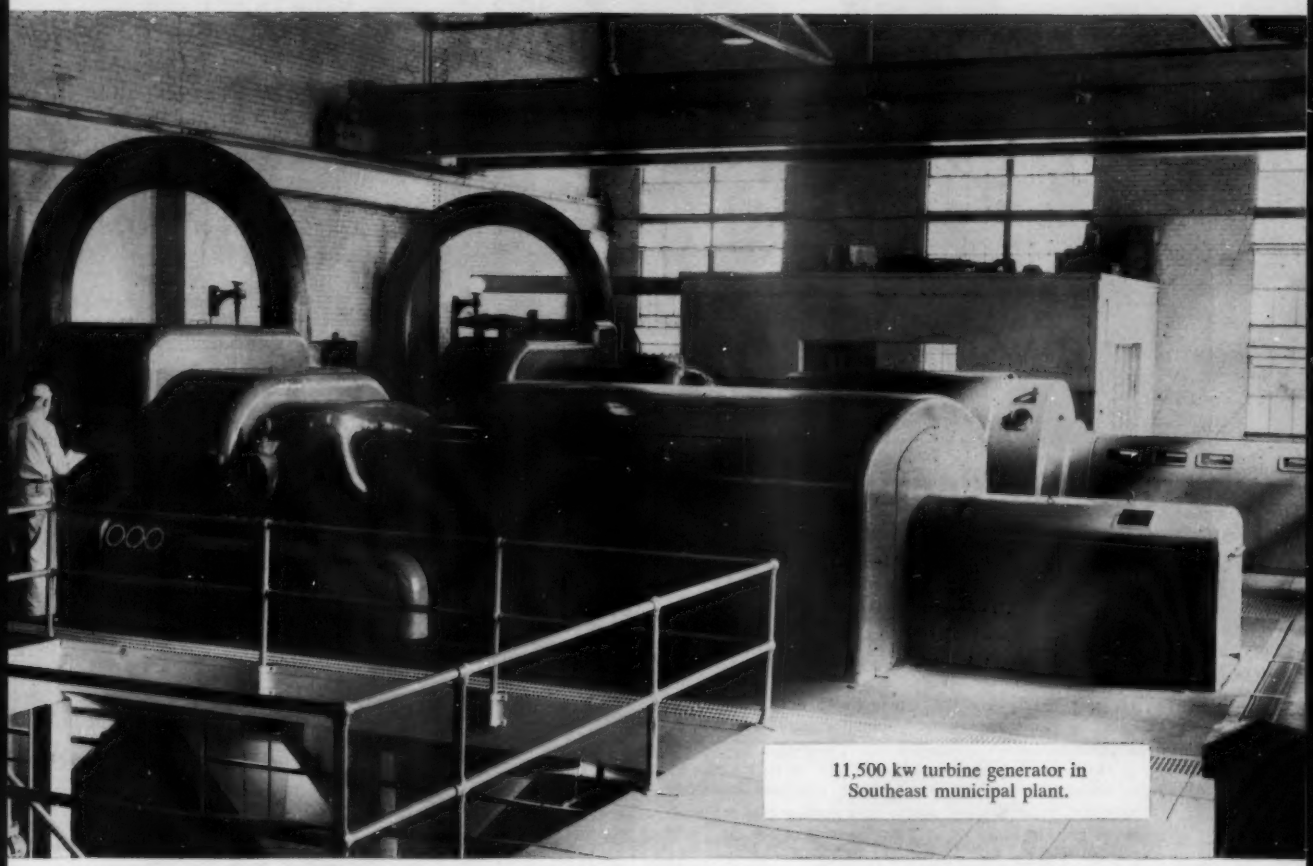


through a thermal-pressure molding process. Coming in 4-ft lengths, this pad is pliable yet snaps back into place, says manufacturer, and it will not dust in the user's hands. Purpose of the arch in this pad is to keep the acoustic insulation free from the inside surface of perforated panels, so that painting or washing will not impair their acoustical efficiency. This was formerly accomplished by a flat, short glass fiber pad resting on wire chairs; these kept the insulation free from moisture but complicated the installation of the acoustical treatment. Detroit Steel Products Co.

37—LUBRICATING SYSTEMS take high temperature

Centralized lubricating systems designed to withstand temperatures to 500 F while providing automatic lubrication are announced. The systems use valves and filters combining heat-resistant qualities with desired filter and flow control characteristics, company states. Successful use on different types of machinery operating under temperatures from 200 to 500 F is reported—including flatwork ironers in commercial laundries, and valve stems of large industrial gas engines. High temperature units are available in most of this company's cyclic, continuous and "one shot" centralized lubricators.

The systems have three basic components: 1) a combination pump-reservoir that feeds oil at a predetermined frequency and volume into 2) a single-line distribution system with junctions and



11,500 kw turbine generator in Southeast municipal plant.

Specializing in turbine generators up to 15,000 kw gives better quality control and product service

Take priority, for example. Because Worthington is not involved with building the huge central station turbine generators, they give A-1 priority to the design and manufacture of industrial and municipal units.

Every Worthington turbine generator receives the personal attention of top engineering and manufacturing personnel. Skilled craftsmen, with years of experience in the manufacture of turbine generators, take pride in their job of building reliability into every part. They take the time and trouble to take care of the little things that mean so much to dependable operation. Their attention to detail is reflected in such things as the dials which are recessed and mounted at an angle for easy reading. And before it is allowed to leave the factory, every unit is completely assembled and meticulously tested.

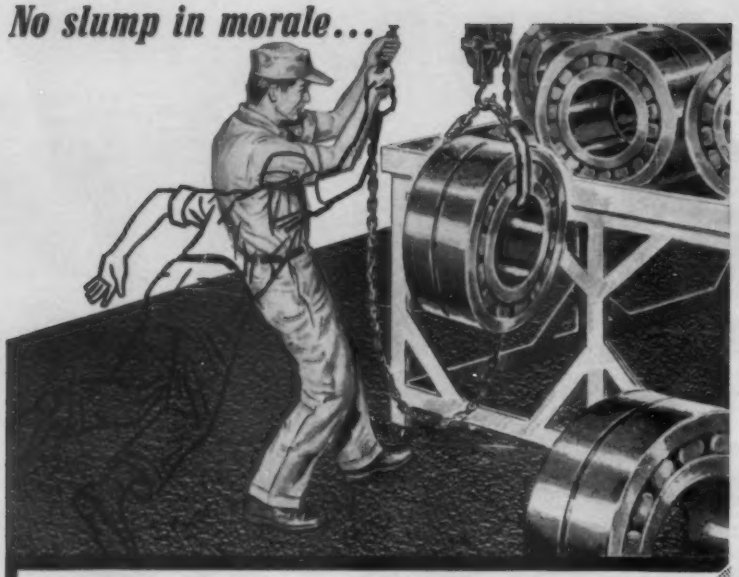
When considering a turbine generator installation up to 15,000 kw, call on the *specialists* in the field. Get in touch with your nearest Worthington District Office or write for Bulletin 1960C. Address Section T63, Worthington Corporation, Harrison, N. J.

T-6.3

WORTHINGTON

For more facts circle 585 on Reply Card

No slump in morale...



The Accident did NOT happen

thanks to A.W. ALGRIP

World's only abrasive rolled steel floor plate

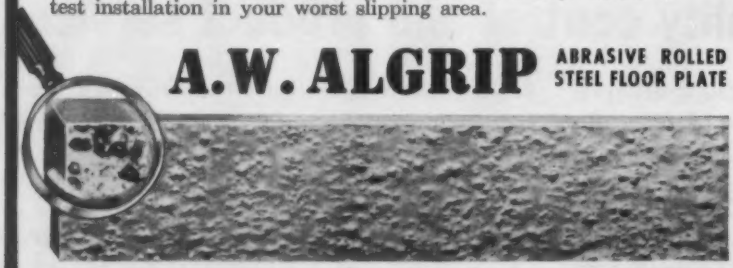
With patented ALGRIP underfoot, men work confidently in dangerous slipping areas—spend more time concentrating on their jobs . . .

. . . and management gets a triple advantage—improved morale, reduced accident rates and slashed insurance costs . . .

because—neither oil, water nor grease can reduce the powerful friction-grip action of ALGRIP's uniformly embedded abrasive particles. Easily fabricated ALGRIP—it can be overlaid or used as a complete flooring—is tough steel plate into which a grinding-wheel type abrasive has been rolled—*not coated*—to a controlled depth as an integral part of the steel. Wear and tear merely expose more abrasive.

Nationwide, ALGRIP is paying for itself in safety. Make a test installation in your worst slipping area.

A.W. ALGRIP ABRASIVE ROLLED STEEL FLOOR PLATE



ALGRIP—approved for safety by Underwriters' Laboratories.

ALAN WOOD STEEL COMPANY
Conshohocken, Pa.

Please send A.W. ALGRIP Booklet AL-29

Name _____

Title _____

Company _____

Address _____

City _____ Zone ____ State _____

Other products: A.W. SUPER-DIAMOND Rolled Steel Floor Plate—Plates—Sheets—Strip—(Alloy and Special Grades)

For more facts circle 586 on Reply Card

NEW PRODUCTS

(Begins on page 130)

branch lines leading to each lubricating point at which 3) a meter-unit filters and measures oil and maintains one-direction oil flow. It is pointed out that several lubricant suppliers have developed oils suited to the requirements of these systems and having ability to resist carbonizing at high temperature. Bijur Lubricating Corp.

38—DOOR SWITCH is offered in small size

This subminiature door interlock switch, the 7AC1-T, for use on hazardous, high-frequency equipment cabinets, is designed to cut off power automatically when a service door is opened. By pulling a rod actuator to the maintained contact position, it is possible to check circuits with the power on, company states; the rod automatically returns to normal position when a door is closed. Basic switching element has fine silver contacts and snap-action spring. Contact arrangement is single-pole double-throw. Total travel in either direction of actuator plunger is $\frac{5}{32}$ in. Micro Switch, Div., Minneapolis-Honeywell Regulator Co.

39—HANDY TWEEZER works where space is limited

Although intended for electronics and electrical work, the Tension Tweezie is suggested for mechanics and others

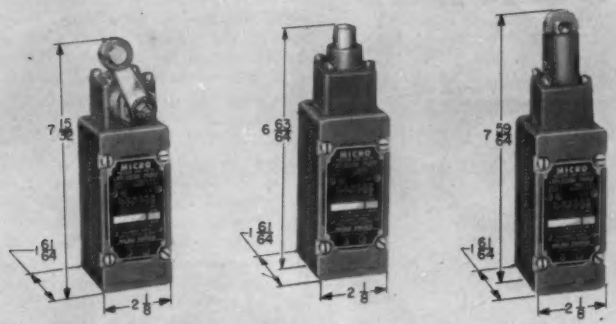
working in restricted areas. It is a long pointed tweezer designed to reach into cramped quarters and hold the smallest electronic parts; the tension feature lets it hold the part without finger interference or pressure. Hunter Tools.

40—BRONZE PUMP handles moisture entrained gases

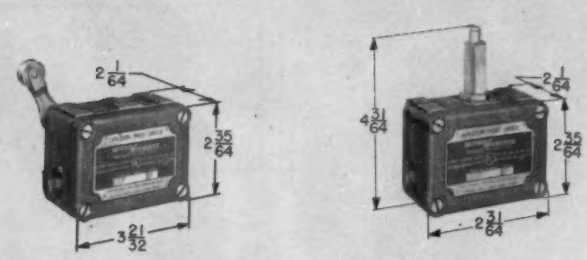
The Dexter-Conde Bronze Pump is announced as a corrosion-resistant rotary pump for vacuum and/or pressure applications in handling steam, hydrogen, natural or manufactured gas, nitrogen or other inert gases carrying entrained moisture. Bronze construction of rotor and housing is designed to eliminate "freezing" due to water-vapor corrosion at the limited-clearance rotor extremities and housing end-plates. Company says that a feature of this positive dis-

MICRO precision switches

...THEIR USE IS A PRINCIPLE OF GOOD DESIGN



MICRO SWITCH heavy duty explosion-proof switches. Roller arm actuated (left), plunger-actuated (center) and roller plunger-actuated (right).



Explosion-proof switches with wide variety of mounting arrangements. Roller arm-actuated (left), plunger-actuated (right).

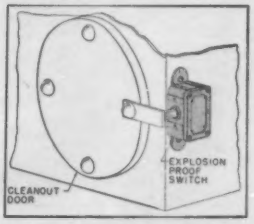
These reliable switches are insurance against many types of plant fires and explosions

MICRO explosion-proof switches are ideal electrical controls in flammable areas. They combine the ability to operate safely in explosive gas or vapor-air atmospheres with the desirable features of precise operation, accurate repeatability, small size, easy adjustment and durable construction. They are the most compact explosion-proof switches available.

MICRO explosion-proof switches are widely used in such hazardous atmospheres as those found in chemical plants, refineries, flour mills, coal mines and metal processing plants. They are Underwriters' Listed as suitable for use in hazardous locations Class I, Group C (atmospheres containing ethyl-ether vapor) and D (atmospheres containing gasoline, petroleum naphtha, alcohols, acetone, lacquer solvent vapors and natural gas); Class II, Group E (metal dust), Group F (carbon black, coal or coke dust) and Group G (grain dust).

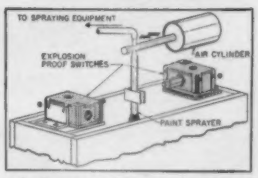
These switches are ideal components for installation on present plant equipment to make it safer, more automatic and more productive. MICRO precision switches are sold by distributors in key cities everywhere. Look under "Switches, Electric" in the yellow pages of your phone book.

As Incinerator Safety Interlock



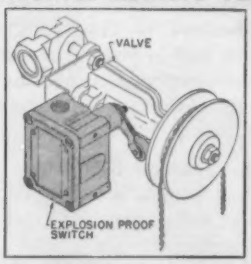
A snap-action explosion-proof switch on an oil or gas-fired incinerator prevents ignition of the fuel while the unit is being cleaned or repaired. The switch is held operated when the door is closed. Opening the door releases the switch actuator which prevents starting the ignition transformer.

Controls Automatic Paint Sprayer



Two switches speed up painting of parts and automatically shut off the spray gun at the end of each operation. When arm leaves the air cylinder, Switch "A" is released, starting the spray gun. Contact with Switch "B" turns off the spray. The painted part is removed and the operations repeated.

Control for Remote Valve



Explosion-proof switch notifies operator of the position of the disc in a remotely located valve. The valve, which contains a flammable liquid, is controlled from the floor below by means of a chain-operated wheel. The roller arm actuator is operated by the rim of the chain wheel. It is wired to a set of panel lights which indicate the disc position of the valve.

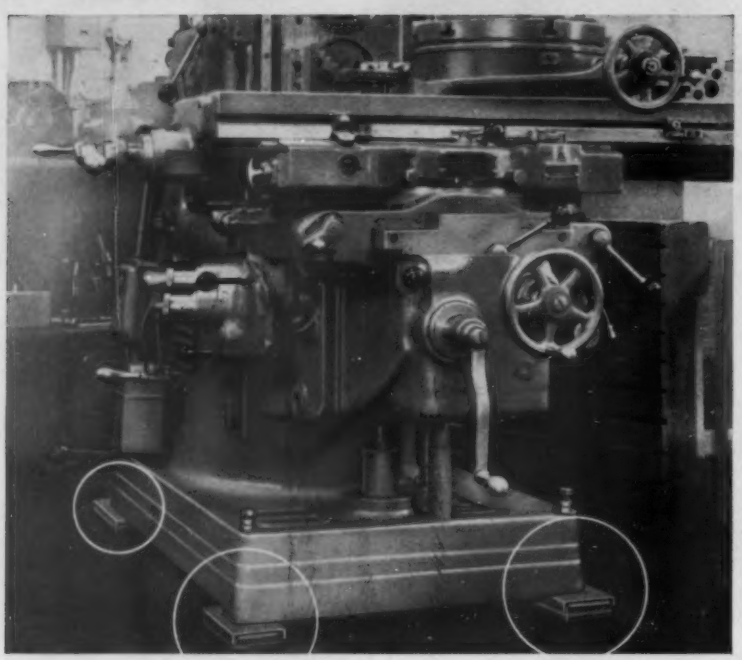
MICRO SWITCH

A DIVISION OF MINNEAPOLIS-HONEYWELL REGULATOR COMPANY

In Canada, Leaside, Toronto 17, Ontario • FREEPORT, ILLINOIS

For more facts circle 587 on Reply Card

KORFUND
MACHINERY MOUNTINGS



let you **INSTALL MACHINERY in MINUTES**

Machinery installation need not be the tedious, time-consuming (and therefore costly) job it once was. Korfund units let you install machinery in minutes.

For example, machine tools like this precision miller need not be bolted to the floor because the LEV-ELASTO Dampers used prevent "walking". Leveling, with the built-in leveling screws requires only a wrench and a few minutes time—eliminating shims and saving both time and temper. And, as an added plus, the Dampers protect the machine from transmitted vibration that can cause rejects.

Of course, all our installations are not as simple as this—in some cases, tremendous weights are involved, or vibration problems are critical, or both. In these cases, plant engineers are enthusiastic about Korfund Steel Spring Vibro-Isolators.

Solving vibration control and machinery mounting problems is Korfund's specialty. We have more than a half-century of experience in the field. Our experience lets us recommend "the right way the first time"—no trial-and-error basis is necessary.

Write for your copy of the Korfund Plant Engineers' Guide—you'll find it full of helpful information. Ask for Bulletin 33A.

For specific recommendations contact us or one of the 46 local Korfund offices. Look under "Korfund" in your local Telephone Directory or in Thomas' Register.

THE KORFUND CO., INC.

KORFUND VIBRATION CONTROL — SPRINGS — RUBBER — CORK

48-35R Thirty Second Place, Long Island City 1, N. Y.
In Canada: 510 Canal Bank, Ville St. Pierre, Montreal

For more facts circle 588 on Reply Card

NEW PRODUCTS

(Begins on page 130)

placement pump is the Graphitar vanes which require no lubrication in riding against the cylinder wall; the pump doesn't have to be lubricated and no oil is present to get into the gas stream. Also there is no danger of sparks or explosion, it is noted.

The pump is described as pulseless and vibrationless, delivering an even flow of air without need for surge tanks. It comes in three models with capacities ranging from 3.5 to 33 cfm, and maximum continuous pressure, 20 psi. Maximum steady vacuum is to 20 in. Hg and maximum intermittent vacuum is 25 in. Hg. The pump is available with single or double shaft extensions and may be furnished for clockwise or counter-clockwise rotation. Dexter Folder Co.

One of these products may be "just what you're looking for." Use the handy Reader Service Cards to ask for more information on it.

41—AIR CLEANER, self charging electrostatic unit

The Heavy Duty Pliotron is constructed in three sections, each consisting of electrostatic plastic materials. The intake side is a screen of vinylidene chloride and the outlet side, a plastic-bonded glass-fiber mat. Sandwiched between the outer layers is shredded polyethylene film. This self-charging electrostatic air cleaner was developed to overcome problems in applications where dust concentration is unusually high, where large particles such as chaff, straw and insects impinge on filter surfaces, and where effective single-pass filtration is required. Goodyear Tire & Rubber Co.

42—CASTER WHEEL with a smooth contour design

Food processing plants and others requiring maximum cleanliness in their operations will find the Sta-Clean Caster Wheel useful, according to manufacturer, because its smooth contour design makes it completely sanitary. There are no sharp edges or corners where flour, food particles and other materials can build up, it is noted. The wheels can be furnished for company's 1-A, 36-A, 40-A and 41-A series casters in 4-, 5-, and 6-in. diam sizes. Bond Foundry and Machine Co.

43—PIPE COMPOUND, seals chemicals, corrosives

John Crane Chemlon Pipe Joint Compound will seal practically all known highly corrosive liquids and solvents, manufacturer states. This chemically inert material has a base of duPont Teflon

For more facts circle 589 on Reply Card →

Experience

. . . is only one reason P&H Overhead Cranes outsell every other brand on the market

Ask a user why he bought a P&H Overhead Crane. Chances are he'll say: "Well, P&H has been making them for 72 years. They ought to know how to turn out a good serviceable crane by now."

We do. And part of the reason we do is because we make every part of a P&H Overhead Crane right in our own factory. From gigantic steelwork down to the tiniest electric control — it's all P&H made.

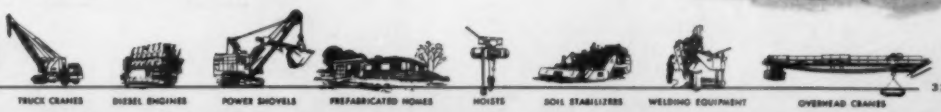
What this means to you is that there's a wealth of coordinated experience behind every part in your P&H Overhead Crane. It means that every part is made right—so that you have a smoother-running, more efficient piece of equipment.

Plus our experience in making them, there's also the 72 years of experience our customers have had in using them. Take either experience as a recommendation and you can't go wrong.

HARNISCHFEGER

MILWAUKEE 46, WISCONSIN

the P&H *Line*



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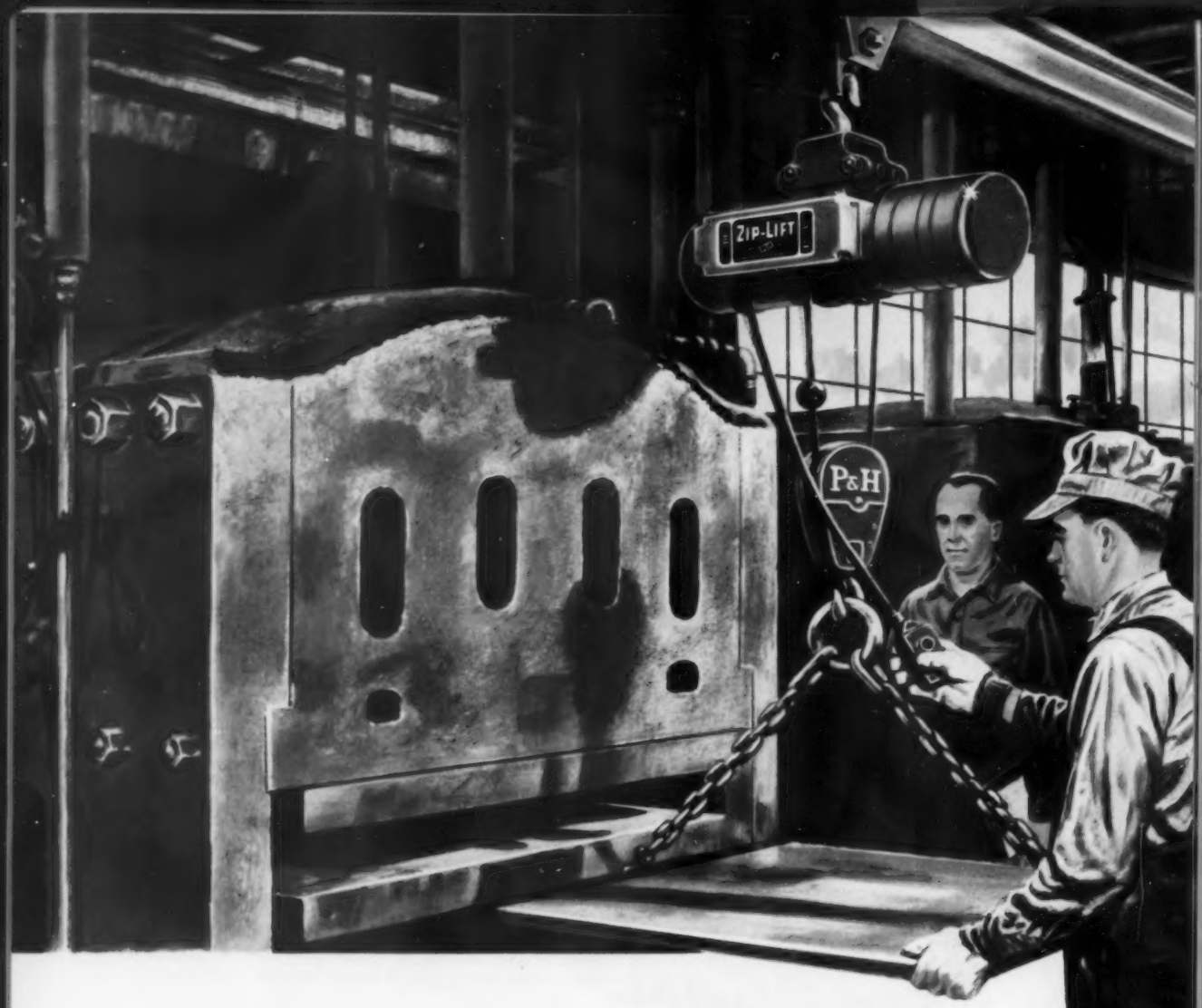

Experience

...works two ways to bring you efficient, work-saving, time-saving P&H Hoists

There are two kinds of experience. One is the kind of experience we have had in building top-quality hoists ever since 1891. The other is the experience our customers have had in using these P&H Hoists in every kind of application. Both types of experience work to bring you a better hoist for your money.

If you're interested in getting the benefits of this double experience in the next hoist you buy — investigate the complete P&H line. See how it utilizes this accumulated experience to give you the best hoist on today's market.

Start now by calling your nearest P&H Hoist distributor, or by dropping us a postcard and asking us for free information on the type of hoist you need.

HARNISCHFEGER

MILWAUKEE 46, WISCONSIN

the P&H *Line*

TRUCK CRANES · DIESEL ENGINES · POWER SHOVELS · PREFABRICATED HOMES · HOISTS · SOIL STABILIZERS · WELDING EQUIPMENT · OVERHEAD CRANES

3123

(Begins on page 130)

and is claimed impervious to all hard-to-handle fluids and to possess an extremely low coefficient of friction. The latter substantially reduces wrench torque, it is noted, permitting connections to be drawn up tighter without undue stress or strain. The non-adhesive quality of Teflon and non-hardening characteristics of the compound allow the connections to be readily disassembled, even after long, severe service, according to company. The compound is suggested for use on aluminum, stainless, Monel or plastic pipe. Crane Packing Co.

44—NAIL PULLER is fast working, air powered tool

This automatic tool is claimed to remove nails from crates and lumber in a fraction of a second. Built around company's air motor (air cylinder with built-in control valve), this puller is declared easy to use and it weighs only 10 lb.

The one air connection required may be made with the 12-ft length of ¼-in. hose supplied. According to manufacturer, the tool's pulling action is quick and clean—lumber may be re-used without loss, and nails are undamaged because the pull is always perpendicular and the heads are left intact because the shaft, rather than the head, is gripped. Bent, rusted and treated nails are also claimed easily removable. Two models are available: one for common nails in the range of three- to seven-penny sizes; one for six- to ten-penny sizes. The units differ only in the size of the jaws, and an extra set of jaws may be purchased. The Bellows Co.

45—METAL DETECTOR has automatic drift control

For protecting production equipment and product in rock crushing, mining and cement operations, this electronic "inspector" can be pre-set to detect unwanted metal ranging in size from chips to chunks. The device is announced as incorporating features expected to produce more efficient and economical inspection of rock and mining products. These include: automatic drift control, an elec-

BRANCH
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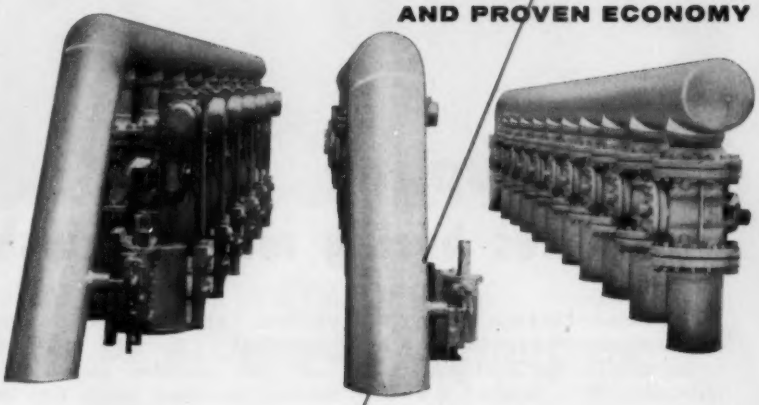
WELDOLETS

FOR ASSURED STRENGTH
AND PROVEN ECONOMY



WELDOLETS

THREDOLETS

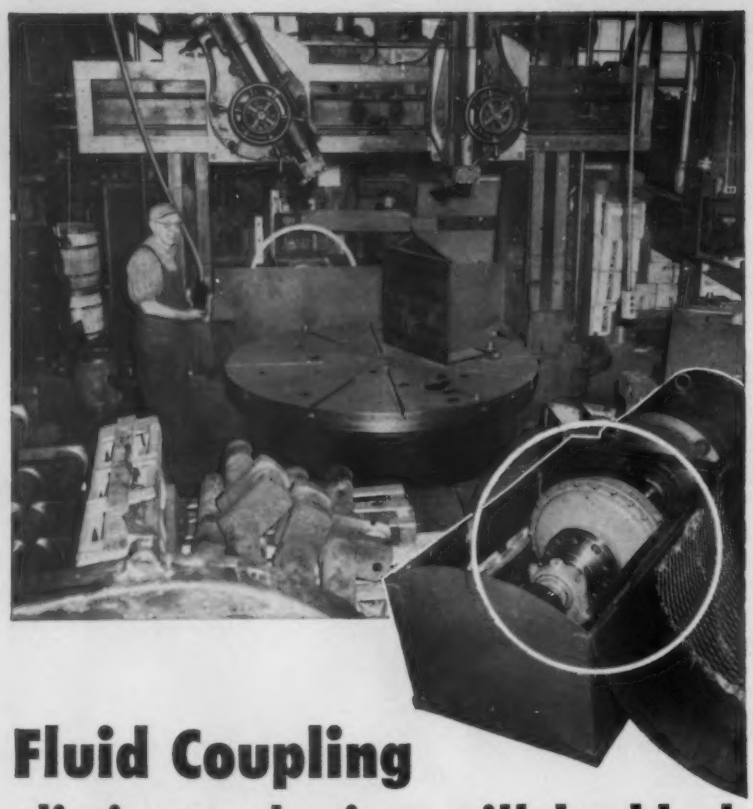
SOCKOLETS

Are you effecting this economy for your company? Neat and uniform appearance is evident in code constructed weldolet headers in this crude oil pipeline terminal. The money saved is in the bank and does not appear in this picture. If you are not using the weldolet method of cutting piping costs, write today for information.

SOLD THROUGH LEADING DISTRIBUTORS

BONNEY

WELDING FITTINGS DIVISION
BONNEY FORGE & TOOL WORKS
727 Meadow St., Allentown, Pa.
For more facts circle 590 on Reply Card



Fluid Coupling
eliminates boring mill backlash

To *eliminate* blacklash, and to obtain *maximum performance* from a boring mill, Doelger & Kirsten, Inc., Milwaukee, Wis., installed a Twin Disc Model HCM Fluid Coupling between a 25 horsepower motor and the machine.

Prior to this installation, the company had never obtained maximum use of the machine because of backlash. This prevented making maximum cuts at maximum feed, thus impairing the finish.

According to William Reichert, Plant Foreman, "Since installing the Twin Disc Fluid Coupling, we can take extremely heavy cuts at maximum feed. By eliminating backlash, an excellent finish is assured." In summarizing the advantages gained by this installation, Reichert indicated: (1) Inching facilities now extremely good. (2) Gear-teeth chatter has been eliminated. (3) Forward and reverse of motor is no longer a problem. (4) The conversion was economical.

If *your* operation calls for a smooth, cushioned, steady flow of power . . . no motor or engine lugging, stalling or burning out on heavy starts . . . output torque equal to input torque . . . get complete information *now*, about Twin Disc Fluid Couplings—offered in a wide variety of sizes, for any motor or engine application from ¾ to 850 hp. Write Twin Disc Clutch Company, Dept. DS, Racine, Wis. Request Bulletins 144-D and 145-C.

TWIN DISC
CLUTCHES AND HYDRAULIC DRIVES
TWIN DISC
Fluid Couplings

TWIN DISC CLUTCH COMPANY, Racine, Wisconsin • HYDRAULIC DIVISION, Rockford, Illinois
Branches or Sales Engineering Offices: Cleveland • Dallas • Detroit • Los Angeles • Newark • New Orleans • Tulsa
For more facts circle 591 on Reply Card

NEW PRODUCTS

(Begins on page 130)

tronic circuit that holds the detection sensitivity at a constant level regardless of temperature fluctuations; long tube life; heavy-duty bi-sectional aperture frame, constructed of marine mahogany to facilitate installation and removal of the frame without cutting endless-type conveyor belts. The metal detector can be installed so that upon detection of tramp metal, it will trigger any one or a combination of three alarm systems: stop the conveyor belt, sound a horn, or activate a warning light. Radio Corp. of America.

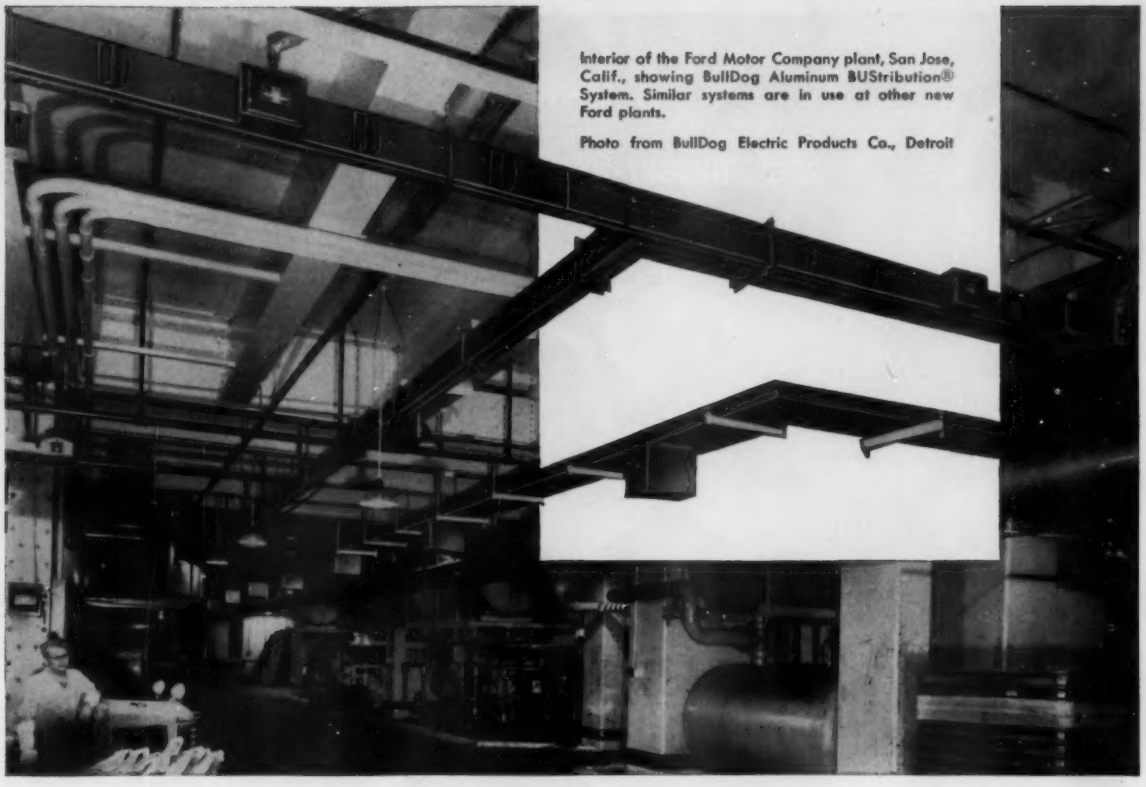
46—BELT CONVEYOR for the heavy-duty loads

Equipped with a heavy-duty wire mesh belt, this conveyor is ruggedly built to handle tough assignments. According to manufacturer, it will handle hot forgings with ease, and heavy objects with slick

surfaces or awkward shapes are no problem. It is claimed to handle any material normally handled on wire mesh belt, on any job where a maintenance free conveyor is a requirement. With it you can take material directly from presses, benches or loading docks and transfer it to other operations, it is announced. The conveyor can be used in stationary locations, but is equipped with casters and handles by which it can be rolled from job to job. The belt comes in a variety of weaves, spacing and flight sizes. Motors are available in standard voltages. Cooney Industries, Inc.

47—THINNER TAPE, of cementable Teflon

Cementable Teflon tape, formerly limited to greater thicknesses, is now announced as available in continuous rolls in thicknesses from 0.005 in. to 0.060 in. in widths from ½ to 12 in. Cementable Teflon sheets (24-by-24 in. to 48-by-48 in.) in thicknesses from ⅛ in. to 1 in. are also offered. The material has a slippery surface on one side and a prepared surface on the other for bonding with commercial adhesives to wood, glass, metal or plastic. According to manufacturer, this thinner tape is lower in cost and will expand the use of Teflon as linings for



Interior of the Ford Motor Company plant, San Jose, Calif., showing BullDog Aluminum BUStribution® System. Similar systems are in use at other new Ford plants.

Photo from BullDog Electric Products Co., Detroit

FORD INSTALLS BUSWAYS USING 1,500,000 POUNDS OF ALUMINUM CONDUCTOR

Installation costs less, provides more power per pound of metal. System is more flexible and operates with no increase in voltage drop or temperature rise over comparable copper system.

Since 1951, Ford Motor Company has been equipping its new plants with aluminum bus distribution systems. These include plants at Detroit, Chicago, Buffalo, Cleveland, Louisville and San Jose.

By switching to aluminum, Ford diverted more than 3 million pounds of critical copper to other uses. And Ford acquired a distribution system at lower cost.

Because aluminum is lighter, Ford received more conductor per pound of metal . . . put less weight on the building superstructure.

Because aluminum costs less than copper, Ford received more conductor per dollar invested.

And these prefabricated conductors make a neat, safe, flexible installation that brings power to the job in any amount at any location. They can be readily moved to meet new power demands. Standard fittings, tools and methods are employed.

For more information on these modern packaged plant distribution systems, contact your nearby Alcoa sales office. Or write Aluminum Company of America, 2301-G Alcoa Bldg., Pittsburgh 19, Pa.

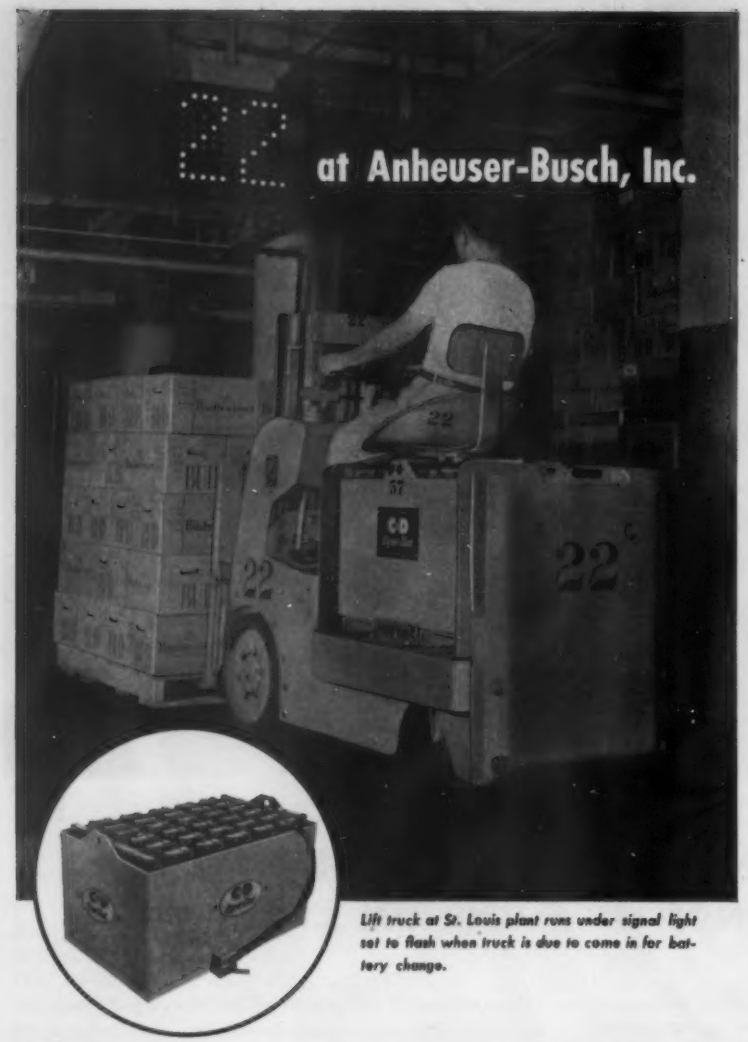
Your Guide to the Best in Aluminum Value

ALCOA ALUMINUM

ALUMINUM COMPANY OF AMERICA

THE ALCOA HOUR
TELEVISION'S FINEST LIVE DRAMA
ALTERNATE SUNDAY EVENINGS

For more facts circle 592 on Reply Card



Lift truck at St. Louis plant runs under signal light set to flash when truck is due to come in for battery change.

C&D Batteries for EXTRA work

Anheuser-Busch, home of the famous Budweiser, is known for tradition in product—but modernization in production. At the St. Louis plant, showplace of the industry, C & D *Slyver-Clad*® batteries help keep this 'round-the-clock operation going full speed.

Anheuser-Busch employs a unique signal system for calling "due" batteries in for a "quick change" in a matter of minutes—which gives them full truck speed throughout the day.

C & D batteries are approved as standard equipment by all electric truck manufacturers. For further information, write for Catalogs.

C&D BATTERIES, INC.

of Conshohocken, Pa.

50th ANNIVERSARY

INDUSTRIAL BATTERIES SINCE 1906

SALES AND SERVICE OFFICES IN PRINCIPAL CITIES FROM COAST TO COAST

For more facts circle 593 on Reply Card

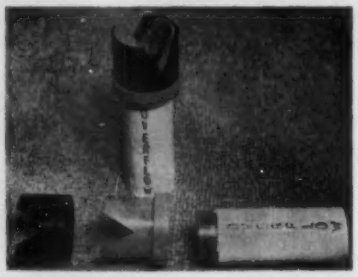
NEW PRODUCTS

(Begins on page 130)

conveyor guide rails, hoppers, baking pans and other work surfaces handling foodstuffs, and corrosive materials. Catalog AD 158 gives details on the tape. The Garlock Packing Co.

48—CONTROL DEVICE for cooling tower bleed-off

The V-Notch Weir is described as a simple device for easy adjustment and control of bleed-off in cooling towers and evaporative condensers. It is designed to provide variable bleed-off for control of concentrations and also to act



as a skimmer for removal of suspended solids and such surface trash as dead algae and slime. Scale deposition and corrosion are reduced and controlled by controlling the concentrations and using properly formulated chemical treatment. The V-Notch Weir is easy to install, manufacturer states; it is mounted by simply cutting and threading the overflow pipe so that the assembled height, with the weir, will be the same as the original overflow pipe. The volume of bleed-off is controlled by turning the sleeve fitting, thereby adjusting the depth of the V-Notch. The entire unit is of Saran plastic. Deady Chemical Co.

49—IMPROVED HANDLER for acids, other liquids

The Tripl-Duty Truk-Boy is designed for safer transporting and pouring of acids and other liquids. Features announced include a safety ratchet on the tilter with fingertip control; air vent pouring spout for a splash-free flow; 3 to 5 gpm capacity. The truck offers placement in the carboy tilter. The locking device lets the tilter be held in a rigid position for loading, so the whole operation can be done by one man. The unit is fitted with a base plate, and may also be used to transport stainless steel containers and load them into the tilter. General Scientific Equipment Co.

50—WATER COOLER is versatile packaged unit

Described as a complete package plant on wheels, this portable water-cooling tower is expected to relieve situations in which limited cooling water supplies retard production. It may answer a need in

EPON® RESIN does it!

Paint job still sound after four years of 100% humidity, high temperature ... in antibiotics plant

All surfaces, except stainless steel, are protected by Epon resin-based paint formulated by David E. Long Corp., New York 17, N.Y.

HERE'S HOW...

PAINT LEADS A HARD LIFE in the steamy antibiotics plant of the New York Quinine and Chemical Works. Day in and day out, paint endures live steam and high temperatures. The coating on the processing equipment is exposed to hydrochloric acid and caustic soda. All surfaces take frequent hosing and scrubbing.

No ordinary paint would stand up to such usage. Epon resin-based coatings were applied in the Spring of 1952 throughout the plant . . . on walls and ceilings, on all metal piping except stainless steel, on all processing equipment. This Epon resin ester paint, dried at room temperatures, has given complete resistance to corrosion by chemicals and moisture, excellent adhesion to metals, plaster and concrete, and because of its glossy finish has reduced dust settling.

Four years after it was brushed on, the Epon resin paint looks sound and new. And the Chief Engineer has no intention of repainting this year!

If you have a paint maintenance problem . . . where ordinary paints just can't take it—ask your paint supplier for Epon resin-based paint. You'll find that it is unsurpassed as an all-purpose industrial coating! Call on Shell Chemical sales offices for names of suppliers. Write for the full Epon resin coatings story, "Planning to Paint a Pyramid?"

Epon resins are the epoxy polymers made exclusively by Shell Chemical Corporation.

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For more facts circle 594 on Reply Card

One stop service

Whitney Chain Drives assure profitable production, achieve maximum economy with top efficiency. A complete, versatile line of finished steel chain, attachments and sprockets . . . Whitney chains, chain parts and sprockets are packaged and clearly labeled for fast, easy handling, sure identification. Call your nearby Whitney distributor for complete, fast replacement. His "off-the-shelf" stocks save you time and money. Whitney field engineers can assist on all drive problems. Whitney keeps your production competitive!

New . . . Whitney's packaging includes plastic enclosed disassembled chain parts for easy chain assembly, handling and parts inventory . . . Another exclusive Whitney service!

Whitney
CHAIN COMPANY
232 HAMILTON STREET • HARTFORD 2, CONN.

ROLLER CHAIN • SILENT CHAIN • CONVEYOR CHAIN • SPROCKETS • FLEXIBLE COUPLINGS

For more facts circle 595 on Reply Card

NEW PRODUCTS

(Begins on page 130)

small chemical plants, and even in air conditioned buildings. It is now being used in conjunction with portable oxygen-generating plants in remote locations. Compact and lightweight, it has all necessary accessories—pumps, strainers, electrical control equipment, pressure gages, thermometers and feedwater conditioner.

A typical tower is of steel packed with 20-in. Fiberglas and having an entrainment separator of copper mesh. The four axial fans have a capacity of 11,000 cfm each. Its design capacity is 240 gpm of 115 F water reduced to 90 F when operating at 95 F air temperature. Badger Mfg. Co.

51—JACKETING, made of deep corrugated aluminum

For use on tanks, towers and vessels, this deep corrugated jacketing is reported to make possible an all-aluminum jacketing job on any installation. Appearance is improved and installation costs are cut, says manufacturer, and the jacketing may be attached with aluminum strapping and seals, or with aluminum sheet metal screws. It is available with 1¼- or 2½-in. corrugations. Rigidity is increased by cross crimping the aluminum before adding the deep corrugations, it is noted, cross crimping adds up to 97 per cent greater strength. A factory-applied moisture barrier, added to the corrugated jacketing, is reported to eliminate corrosion of the jacketing from within and to provide a virtually permanent jacketing job, without need for felt wrapping. Childers Mfg. Co.

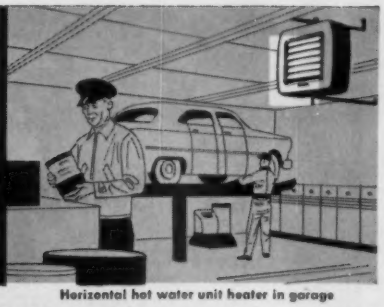
It's easy to obtain product data with the postage-free Reader Service Cards provided on pages 187-188. Use them for information on advertised products, too. Just circle the key number appearing at bottom of the ad.

52—FHP MOTOR designed for coolant pumps

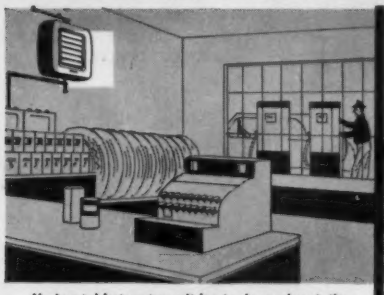
This totally enclosed fractional-horsepower motor is designed especially for driving machine-tool coolant pumps. Featuring the NEMA-C end-shield for direct coupling to the pump, motor can be mounted horizontally or vertically. Smooth contours, including a closely fitted dripcover, make the motor easy to keep free of accumulated metal and dirt particles. Large grease reservoirs are factory filled with a new-type grease, highly resistant to moisture and oxidation. Locked ball bearings receive a constant supply of lubricant for ten years' normal operation, company states. Motor is cooled by conduction and radiation, and internal fans serve to maintain even

Vertical steam unit heater in factory

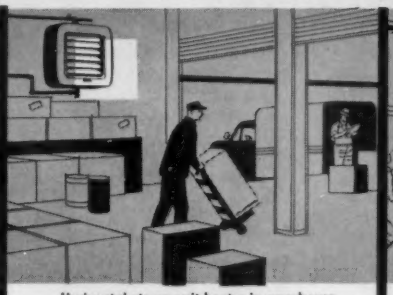
Horizontal gas unit heater in store



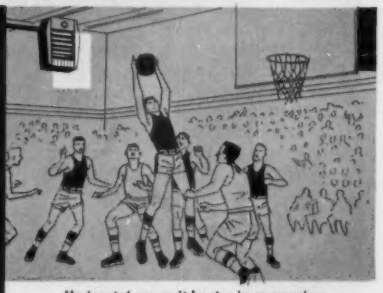
Horizontal hot water unit heater in garage



Horizontal hot water unit heater in service station



Horizontal steam unit heater in warehouse



Horizontal gas unit heater in gymnasium

why so many users of unit heaters say

make mine Modine

Satisfied users continue to insist on Modines. They like the high level of comfort Modines squeeze out of every fuel dollar. And they approve of the attractive appearance, the safety, the silent operation . . . the little care Modines require.

FOR STEAM AND HOT WATER

Modine horizontal delivery models are built in blow-through and draw-through types, in 36 different capacities. Direct-from-pipe suspension hook-up many times saves up to $20 on each Modine unit.

Modine vertical delivery models are offered in 26 different capacities, each with a choice of 4 types of air deflectors.

Write for free Bulletin 155.

GAS-FIRED

Modine horizontal delivery gas-fired models are offered in 8 AGA-approved sizes — 25,000 to 310,000 Btu. Choice of stainless or aluminized steel heat exchanger with stainless steel burner. Units are up to 50% lighter than other makes for lower shipping and installation costs. Modine port design provides four times the free area of conventional drilled ports.

Write for free Bulletin 656.

NOTE: Modine offers a specially built line of premium HCR models for use where internal corrosion is a problem.

For further facts, see the Modine representative listed in the classified section of the phone book, or write Modine Manufacturing Co., 1563 DeKoven Ave., Racine, Wisconsin.

Steam and hot water unit heaters

Gas-fired unit heaters

Modine UNIT HEATERS

In Canada: Sarco, Ltd., Toronto

U-1324

For more facts circle 596 on Reply Card

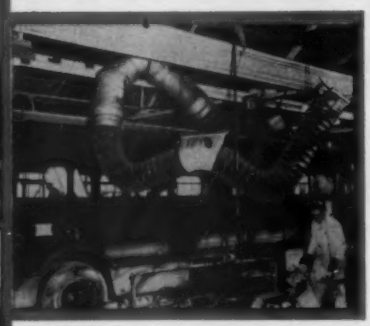
Spiratube®

flexes • bends around corners • snakes around obstacles • goes anywhere!

This cooperative, highly flexible ducting will save you time and money! If your operations require handling of air or gases, or removal of dust and fumes, or if you're moving materials that can be handled by blowing, suction or gravity, check with our engineers on the many things that Spiratube can do for you.

This lightweight, coated ducting "springs to work," because of its patented pre-formed helical wire construction — stays extended even on tight turns without loss of efficiency.

New machines can be located or floor plans changed without complicated changes in rigid ducting systems — Spiratube flexes and bends to meet the outlets.



Rugged Spiratube goes to the work — work doesn't have to be moved to a fixed duct opening! Here, Spiratube is used to remove welding and painting fumes.

Light, readily portable Spiratube goes into tanks and vats, exhausts dangerous fumes rapidly, so that men can work at cleaning inside. Saves hours on this job!

Send the coupon today! Sign Spiratube up for a tough job in your plant! Spiratube is sold through stocking distributors throughout the U.S. and Canada.

Flexible Tubing
CORPORATION
GUILFORD, CONNECTICUT • LOS ANGELES 64, CALIFORNIA

Flexible Tubing Corporation
Dept. 9, Guilford, Connecticut
Please send me more information on Spiratube.
Name_____
Title and Company_____
Address_____
City_____ Zone_____ State_____

For more facts circle 597 on Reply Card

NEW PRODUCTS

(Begins on page 130)

internal temperatures by circulating air to cooler surfaces. Rated temperature rise is 55 C. General Electric Co.

53—HOSE ADAPTER for economical LP-gas conversion

These units were designed to offer a simple and economical method of effecting LP-gas conversions on engines not adaptable to spud-in type installations. They may be used for either vapor or

liquid withdrawal conversions. Primarily for use on tractors, fork-lifts and industrial trucks, adapters may also be used on any type of internal combustion engine to 60 hp. They are equipped with a power and idle adjustment. Venturis are removable type, may be selected to fit specific engine requirements, and fit 1⅜, 1½, 1⅝ and 2⅛ in. ID hose sizes. Installation is described as simple. All that is required is to remove hose, cut a 1 in. section from it, insert adapter and then reconnect hose. For liquid withdrawal systems adapters are used in connection with an Algas 1900-E converter. Vapor systems employ both a primary and a secondary regulator. American Liquid Gas Corp.

54—PROBE PYROMETER for use in liquids, atmospheres

Features of this hand-held probe pyrometer, the Model 321, are lightness and portability, says manufacturer; it is rugged for use in heavy service, and finely balanced for constant hand use. It is suggested for use in all types of non-corrosive metallic and non-metallic liquids, and in atmospheres of furnaces, kilns, ovens and other high heat containers. The instrument has a bright chrome-plated case and handle, which serves to provide an external reflective surface that prevents absorption of heat which would normally change the cold junction temperature. A calibrating thermometer is built into the unit, in the immediate vicinity of the cold junction—an arrangement said to provide a more accurate means of calibration for the cold junction. Thermocouples are refractory bead insulated of the closed end type. The probe is 19 in. long and comes

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When white-hot molten steel is poured, only the finest quality products are specified to insure absolute safety. The wire rope lines that control movement of the ladle above are secured with genuine Crosby Clips. Easily recognized by the famous Red-U-Bolt, genuine Crosby Clips are drop-forged and hot-dip-galvanized for maximum wearing ability. The safest clip sold, genuine Crosby Clips are specified for safety in more plants than any other drop-forged rope fasteners. A complete range of sizes ⅛" to 3".

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Added safety is given to men and equipment using repaired steel chains with genuine Laughlin "Missing Links". As strong as 3B chain, Laughlin "Missing Links" are drop-forged from special forging steel, heat-treated, and matched under pressure for a perfect fit. Available in a complete range of sizes 3/16" to 1⅜" at distributors everywhere.

HANDLES 4 CHAIN SIZES

Four different clevis hook sizes can be interchanged instantly on Laughlin's new Load Binder—industry's safest and strongest. Laughlin's Load Binder with 20-inch handle takes Laughlin Clevis hook sizes ¼", 5/16", ⅜" and 7/16". The 22-inch Load Binder takes ⅜", 7/16", ½" and ⅝" sizes. Extremely strong, Laughlin Load Binders won't spread even under heavy strain because the swivel tongue swings *within* the handle-end slot, and the clevis is on the trunnion.

PERFECTLY ALIGNED

Safer performance and far greater strength are obtained with Laughlin shackles because the pin holes are drilled—assuring perfect alignment. Made of special forging steel throughout, the pins are heavier and stronger than the shackle itself to prevent shearing due to shifting or shock loads. Weldless and drop-forged, famous Laughlin "Perfectly Aligned" shackles are available in a complete range of sizes from 3/16" to 3" at distributors everywhere. For free catalogs on the complete Laughlin and Crosby lines, write the Thomas Laughlin Division, Portland, Maine, or the Crosby Division, American Hoist & Derrick Co., St. Paul 1, Minnesota.

For more facts circle 599 on Reply Card

NEW PRODUCTS

(Begins on page 130)

in two types. The chromelalumel couple has a range of 2300 F (1300 C) and the iron constantan couple has a range to 1600 F. The Pacific Transducer Corp.

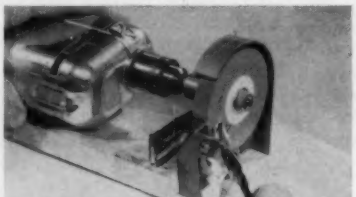
55—ROOF EXHAUSTER of aluminum construction

Named the AlumaLung, this vertical unit is constructed of heavy wall extruded aluminum sections with welded seams. It is only 21 in. high and compact in design, yet claimed to exhaust more dust, smoke, fumes and excess heat

than most roof exhausters of corresponding capacities. No protective coatings are needed to combat weather conditions and air impurities, it is noted, and the louvre-type dampers using the "pin-and-eye" hinge principle and totally enclosed motor do not require lubricants. Maintenance costs are practically extinct, says manufacturer. The AlumaLung is leakproof during severe weather, it is added —even ice and snow accumulation does not affect damper operation. The motor support utilized also serves as a safety guard to protect personnel. The AlumaLung comes in sizes from 24 to 60 in., capacities from 5400 to 42,000 cfm. It is designed to fit standard roof curbs. The Iron Lung Ventilator Co.

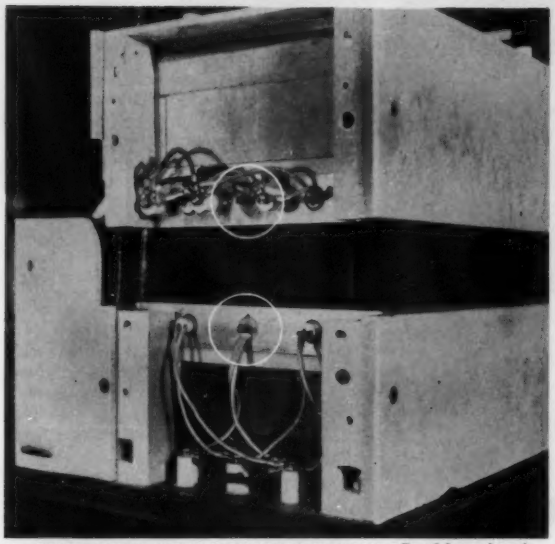
56—TOOL SHARPENER for electric hand drills

For attachment to any electric hand drill, this new model Drillmate sharpens drills up to ½ in. in diam, as well as knives, scissors, chisels, plane bits, and other tools. Device consists of a 3-by-½ in. vitrified grinding wheel mounted on a ⅜

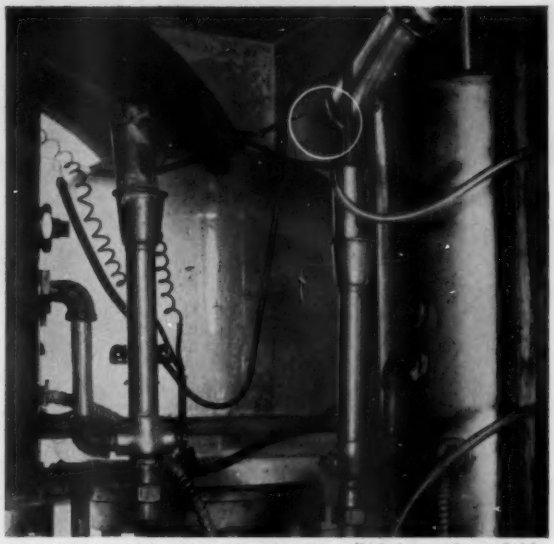


in. shaft (reduced to ¼ in. at opposite end to fit any portable drill chuck). Its nylon bearing is impregnated with graphite and molybdenum disulfide for permanent lubrication. A tool rest is provided with a sliding cam action which keeps edge of rest close to wheel in any position. Drills up to ½ in. diam are sharpened by holding them in a second guide

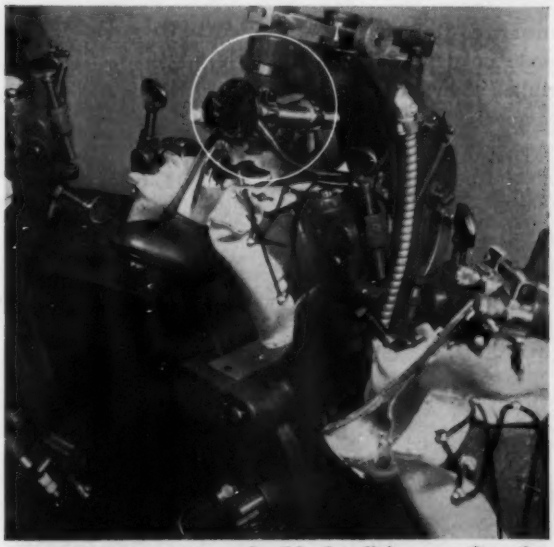
How would you solve these tricky temperature control problems?



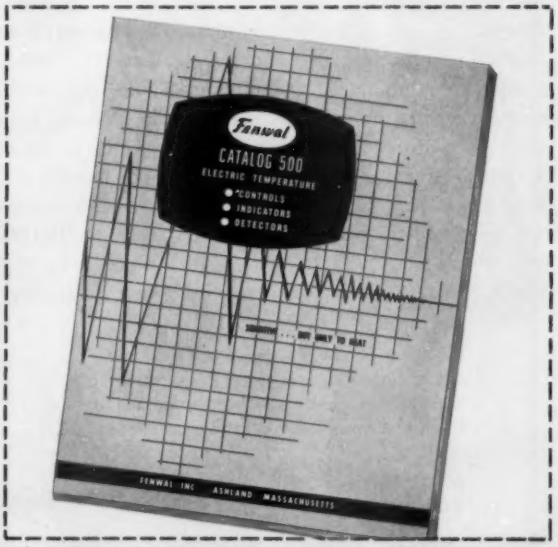
1. CONTROLLING HIGH FREQUENCY HEATING. In this vulcanizing patch press, precise temperature control of the platens was required to prevent loss of electronic heat generated within the processed material. Fenwal's solution was two THERMOSWITCH® units, set at 400F, mounted on the platens. Result: a production rate of 3,000 patches per hour, compared to ordinary hot press methods of 30 per hour.



2. SAFETY IN A DISTILLING PROCESS called for a dependable failure alarm. A Fenwal THERMOSWITCH unit in the condenser's safety vent solved the problem. Now, should the cold water supply fail, steam blowing through the condenser tubes will hit the THERMOSWITCH unit. This control, set at 120F, will then open, shutting off the electric heaters and sounding a continuous alarm.



3. PROTECTING PRODUCTS. In this shoe lining smoother, the problem was twofold: to use the fewest possible thermostats; provide close temperature control in order to prevent burning of shoe leather. Fenwal's solution: a single adjustable THERMOSWITCH unit, mounted on one ironer and controlling two ironers. This halved the number of thermostats indicated, while providing precision temperature control.



4. SEND FOR NEW CATALOG, just off the press. It describes Fenwal's complete line of THERMOSWITCH units and new indicating controllers for industrial applications. Fenwal engineers are always glad to help on any of your temperature control problems. Write **Fenwal Incorporated, 397 Pleasant St., Ashland, Massachusetts.**

Fenwal **THERMOSWITCH®**

Controls Temperature — Precisely

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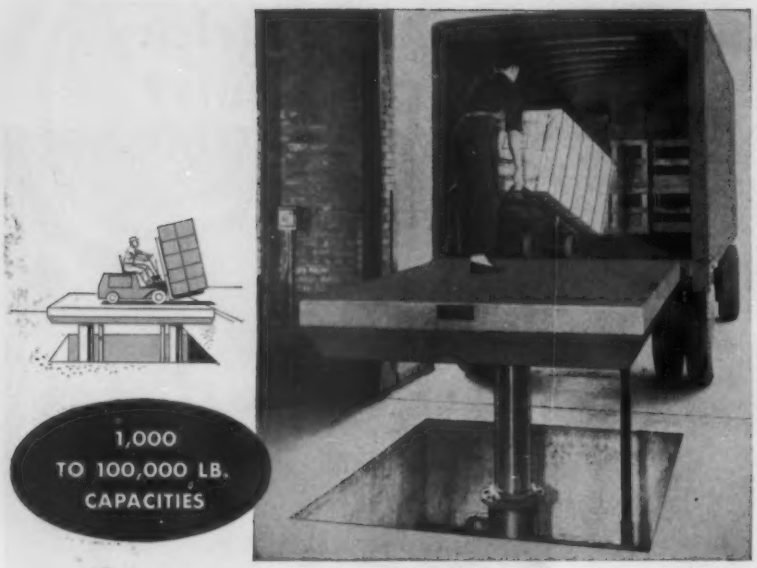
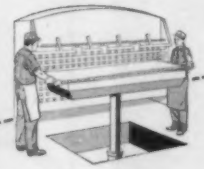


Rotary Levelator Lifts handle heavy loads faster and cheaper

Adaptable to many uses—Economical Rotary Levelator Lifts permit loading and unloading trucks and freight cars direct from plant floor level. Expensive loading docks and ramps are eliminated . . . buildings may be erected on grade at big savings in construction costs. Levelator Lifts also solve the problem of moving materials from one floor level to another and can be used in other ways to speed plant traffic and cut labor costs. When lowered, the lift is level with the plant floor and can be trucked over. Installation is easy, and there's no maintenance problem.

Economical to operate—Rotary Levelator Lifts operate on dependable, low-cost Oildraulic (oil hydraulic) power, using compressed air or electric power unit. A standard model will handle 12,000-lb. loads. Others are built to requirements for lifts of 1,000 to 100,000 lbs. Mail coupon for literature or write our Industrial Division, describing your lifting problem.

Machine Feeding—Levelator Lifts handle loads faster and cheaper than men or makeshift methods and keep materials at the right height for continuous feeding.



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Name_____ Company_____

Address_____

City_____ State_____

Rotary®

LEVELATOR® LIFTS

For more facts circle 601 on Reply Card

NEW PRODUCTS

(Begins on page 130)

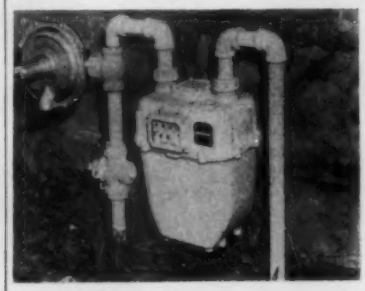
which pivots at just the right angle to restore original point. A drill gage is included for checking point symmetry. Company says the tool can be used on any flat surface without special mounting. Three models ranging in price from about $6 to $3 are available. Model described has general purpose grinding wheel—another model has soft green grit wheel for masonry drills and carbide tipped tools. Popular Mfg. Co.

57—CLEANER washes n' dries the small metal parts

The Roll-O-Matic Metal Laundry is designed to automatically wash, rinse, rust-protect and dry small metal parts. According to manufacturer, it not only removes oils and other industrial soils, but also loose chips as well, eliminating hand scrubbing and air blow-off. Dirty parts are loaded into a revolving drum attached to an air cylinder and the drum lowered into the tank. Parts are then rotated in the wash solution for a predetermined period, followed by a spray rinse, a rotating anti-rust treatment, and finally a hot air dry. Washing and anti-rust solutions are salvaged for re-use. After completion of the final stage the drum is automatically raised and the unloading chute lowers. When the operator opens the door, the parts slide into a tote box. The unit can be fabricated to accomplish as many stages as required. Compact in size, it requires only a minimum floor space, says company, and needs no special pit or foundation. Magnus Chemical Co., Inc.

58—REGULATOR offers more versatility, less weight

The re-designed No. 173 Service Regulator is about 2 lb lighter in weight than company's earlier models by virtue of a new weather-resistant aluminum dia-



phragm case. Another new feature is a projecting boss at the bottom of the case, which can be tapped for linking with an extra line when a service regulator is used for pilot-loading a principal regulator — or when a two-stage pressure system is required. It is declared particularly useful for pilot-loading systems with outlet pressures under 1 lb. Meter and Valve Div., Rockwell Mfg. Co.

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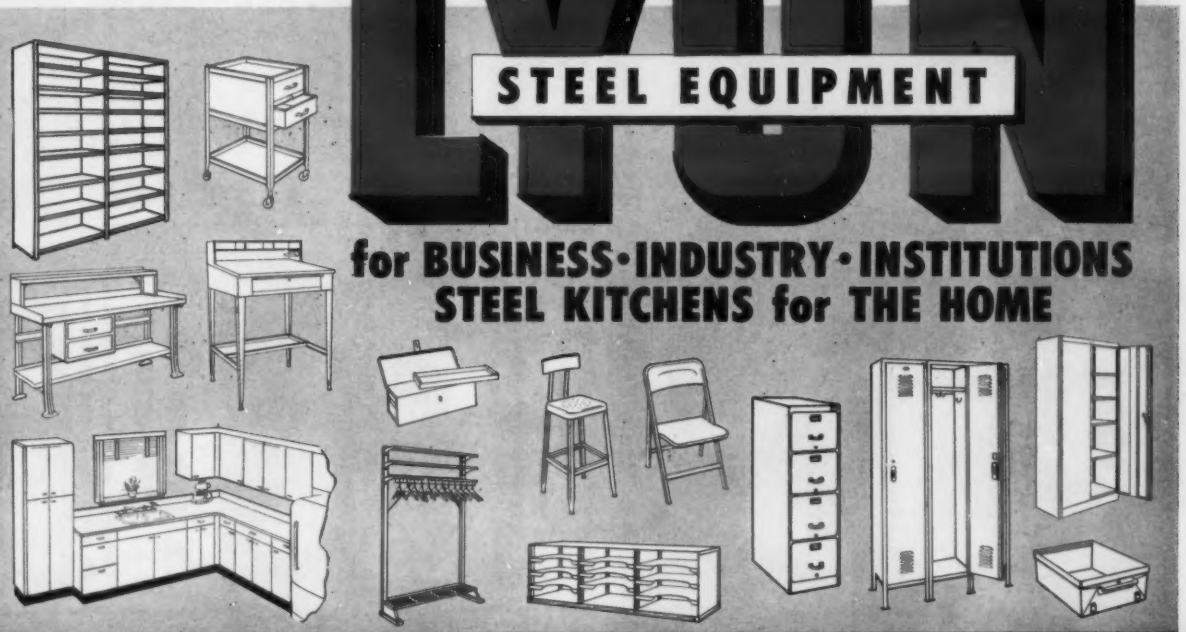

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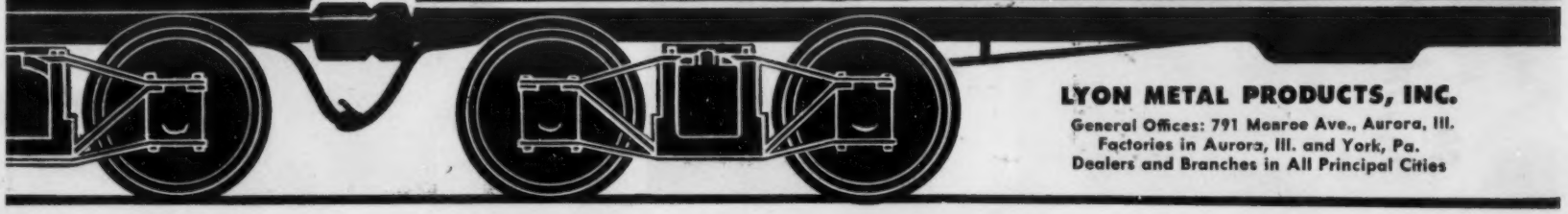
• Stools	• Storage Cabinets	• Tool Boxes	• Toolroom Equipment	• Filing Cabinets	• Work Benches	• Drawer Units	• Tool Trays
• Bin Units	• Drawing Tables	• Parts Cases	• Wood Working Benches	• Hanging Cabinets	• Bench Drawers	• Hopper Bins	• Shop Desks



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For better small tube maintenance

ELLIOTT TUBE CLEANERS and EXPANDERS

ELLIOTT TUBE GAGE

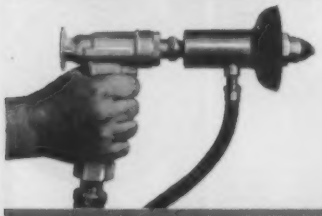
Measures inside tube diameters in .001". A quick, guide for setting tube expanders for condenser and heat exchanger tubes. Three point contact of hardened steel balls insures accurate measurements.

ELLIOTT TUBE EXPANDERS

Roll condenser and heat exchanger tubes quickly and accurately. Rotating, parallel self-feeding rolls insure good joints. For tubes ½ in. through 1½ in., 16 gage.

NEW ELLIOTT 5100 SERIES HEAT EXCHANGER TUBE CLEANER

Powerful air-driven motor with non-rotating, water feeding attachment, trigger-action for motor control, finger-action valve for water flow. Built-in speed governor eliminates shaft-whip. Choice of two sizes.



ELLIOTT JIFFY GUN WITH BOOSTER

Combines water and air pressure for extra power and speed, recommended where water pressure is low, or scale deposit is heavy.

ELLIOTT 600 Series Cleaners

For straight and curved small tubes. Air or steam driven motors. Can be equipped with expanding brushes and scraper heads.

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NEW BOOKS

for the plant engineer

Rules for Selling Ideas

HOW TO SELL AND UNSELL IDEAS by Fred DeArmond. Size 6 by 9 in.; 237 pp; cloth bound. Published in 1954. Lloyd R. Wolfe, Publisher, 476 Park Ave., Glencoe, Illinois. Price $7.50.

IT IS NOT only the salesman that sells. Selling is something each of us does every day in the week—no matter what our job. One man who has to do quite a bit of selling is the plant engineer—especially when it comes to ideas.

Principles to follow to be successful in selling ideas are liberally sprinkled throughout the book. The author also relates an anecdote for each rule which helps you remember the rule by associating it with the story.

Some of these rules are: Don't argue over something beside the point; Wherever possible, attack rather than defend; Reject evidence that is too selective; Don't permit yourself to get angry; and Avoid direct contradiction. These are just a few of the many rules presented in this book.

At the end of each paragraph the author gives a resume of the important points discussed in that chapter.

Plant engineers may find the job of selling new ideas to management much easier after reading and applying the suggestions in this book.

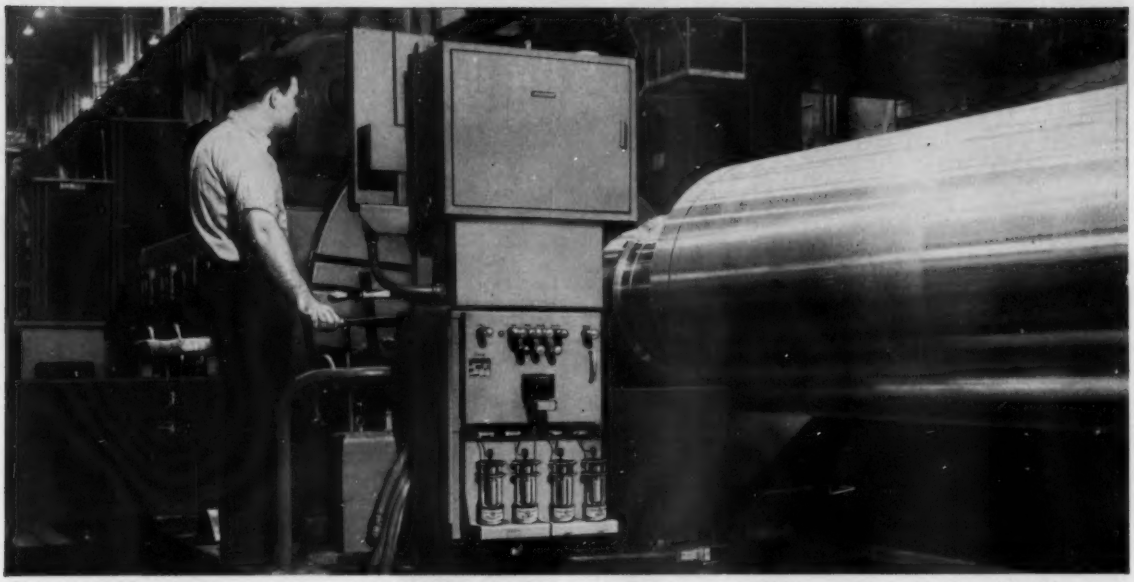
Electronics

ELECTRONS, WAVES AND MESSAGES by John R. Pierce. Size 8½ by 5¾ in.; 318 pp including index; illustrated; cloth bound. Published by Hanover House, Garden City, New York. Price $5.00

AUTHOR OF THIS BOOK is Director of Research of the Bell Telephone Laboratories in Murray Hill, N. J. He has produced an unusual treatment of scientific subjects; his approach is interesting and educational.

The book includes a number of side trips from what may be considered the main course of electronics; these, nevertheless, are related to the principal subject of discussion. In the early part of the book, consideration is given to the laws of motion. One of the items discussed is the orbital velocity of the moon. Later in the book, there is mention of the analogy between gravitational effect of the earth on planets and the electric field effect on electrons.

Attention is given to the flow and control of electrons through an electron gun. The publication contains



Reduced motor downtime, increased plant production . . . these advantages come from replacing with G.E.'s new GL-6807, 6808, and 6809 thyratrons!

New G-E motor-control thyratrons have longer life, 16% lower price!

Three new General Electric thyratrons, each with a different base, so your special needs will be met! No matter whether your panels call for pin-base tubes, for tubes with spade-lug terminals, or tubes with flying leads, your G-E tube distributor can supply you with new, rugged, long-life thyratrons . . . and at a money-saving price 16% lower than the predecessor 5545!

With Types GL-6808 and 6809, you get a warranty up 166%—to 8000 hours. The more substantial spade-lug and flying-lead terminals make this possible. All three General Electric thyratrons share in new features that give added sturdiness and mean long and reliable service: outside-air cooling of anode and grid . . . brazed anode terminal that won't pull off . . . cathode anchored solidly in place.

Phone your G-E tube distributor for full information! He has a quality-plus-economy story that will save you maintenance time and dollars! *Tube Dept., General Electric Co., Schenectady 5, N. Y.*

Pin-base type. Replaces the GL-5545. Also NL-760, C6J, C6J/A, and C6J/K.

Equipped with spade-lug terminals. Replaces Types NL-760L and C6J/KL.

Flying leads. Bracket-mounted. Replaces NL-760P, C6J/F and C6J/KF.

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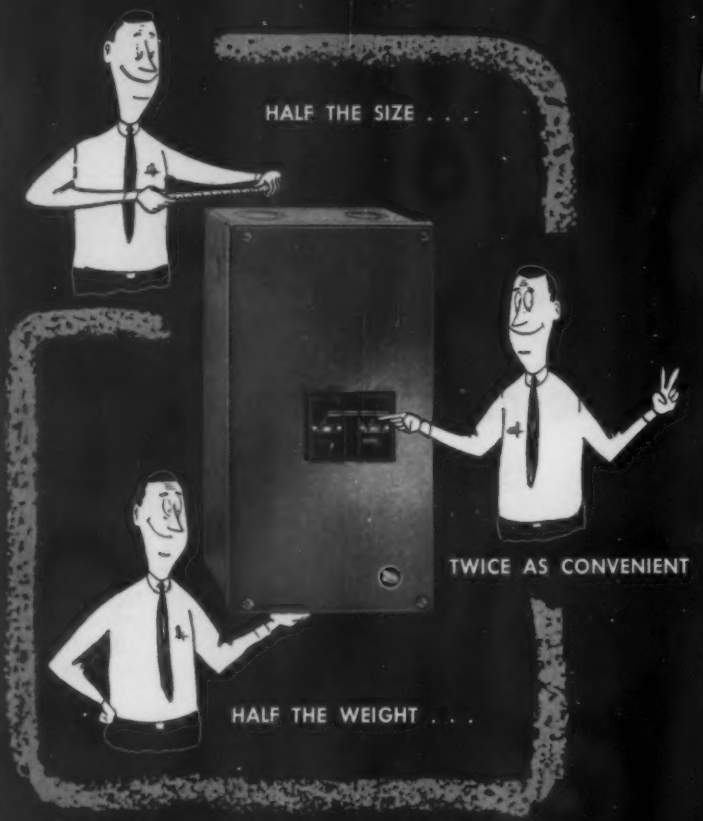

It's easier to install, more convenient to use. After trouble is cleared from the line, a flip of the handle restores service instantly. There's no hunting for fuses . . . no waiting to reset. Heinemann circuit breakers operate hydraulic-magnetically . . . permit safe use of the full capacity of your wiring at any temperature, without de-rating or the extra cost of larger switches. Inverse time delay allows necessary starting currents, prevents false-alarm tripping.

It's less than half the size and half the weight of comparably rated fused switches.

Yet, with all this extra value, the Heinemann Safety Switch costs no more. For descriptive literature, request Bulletin 1411.

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HEINEMANN ELECTRIC COMPANY *Circuit Breakers*

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material on magnetic fields, including mention of the part they play in such things as the cyclotron and electric lenses. A section on waves encompasses a brief discussion on physical optics. This is followed by a streamlined and simplified treatment of Maxwell's equations.

Some of the other items covered in the book are: vacuum-tube amplifiers, signals, band width, noise, radiation, microwave systems, pick-up of television pictures, communication, and relativity and quantum theory.

Piping Design

DESIGN OF PIPING SYSTEMS. Size 11¼ by 8¾ in.; 365 pp including index; illustrated; cloth bound. Published by John Wiley & Sons, Inc., 440 Fourth Ave., New York 16, N. Y. Price $15.00.

COMPLETELY REWRITTEN and substantially expanded, this second edition of the book originally published privately by M. W. Kellogg Company presents a comprehensive coverage of structural design of piping systems. Treatment of the thermal expansion problem is reported to be the most complete and detailed ever published. Consideration is also given to uniform loading due to weight and wind, for example.

The opening chapter is devoted to a discussion on the strength and failure of materials used in piping. Such items are considered as plasticity, plastic instability, failure, creep, types of fracture and fatigue. It is followed by a section on design assumptions, stress evaluation and design limits. Local components such as pipe bends, miters, branch connections, corrugated pipe, flange connections are given attention in one division of the book.

Other chapters cover flexibility analyses, expansion effects, supporting, restraining, bracing, and vibration prevention and control. The appendixes offer charts and tables in addition to a presentation of the history and derivation of piping flexibility analysis which includes many integral calculus equations. Derivation of acoustic vibration formulas is also considered in a separate section.

Power Transmission Chains

DESIGN MANUAL-ROLLER AND SILENT CHAIN DRIVES. Size 11⅛ by 8⅝ in.; 95 pp including index; cloth bound. Published by the Association of Roller and Silent Chain Manufacturers. Write: A. L. Taylor, P.O. Box 5398, Indianapolis, Indiana. Prepaid price, $3.50.

THIS MANUAL of practical and theoretical chain engineering is of use to engineering students as well as practicing engineers. The material is nicely presented and lends itself to

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Bayley

FAN-A-GRAFICS

For Equipment Engineers

"Do's and Don'ts"

OF FAN APPLICATION

DO familiarize yourself with NAFM standards and practices.

DON'T use outlet velocity alone to measure suitability of a given fan to given performance. The ratio of velocity pressure to total pressure is the proper determinant.

DO remember that for a fan of given type and proportions at constant volume and constant point of rating, the wheel diameter varies inversely as the 4th root of the static pressure.

DON'T use multi-blade or close-bladed fans for handling dusts, air-borne solid materials, or under severely corrosive-abrasive conditions unless special construction is provided to resist wear.

DO avoid extremely high wheel speeds in materials handling fans, particularly under corrosive or abrasive conditions. For high-velocity requirements design for injection or induction, so material does not pass through fan.

DON'T obstruct flow to inlet of fans in plenums. Keep inlet at least one wheel diameter from walls or other obstructions. This is particularly important for double-inlet fans.

DO avoid turbulence at fan inlets or outlets, as fan performance may otherwise be adversely affected.

DON'T use direct drive unless performance is accurately determinable, variable speed driver is to be used, or good system control is available.

DO evaluate motor or prime-mover limitations when considering Arrangement 4 fan applications. This arrangement is particularly undesirable for large-size or heavy-duty fans.

DON'T specify or use small-fan arrangements having bearing in inlet. The bearing is excessively obstructive. Such arrangements are not regularly available in small size single inlet fans.

DO use double-width fans where headroom is a paramount consideration, rather than unduly small single-width fans.

DON'T specify arrangements having bearing in inlet if corrosive, abrasive, or high-temperature materials pass through fan. If double inlet fan is necessary, use inlet boxes and outboard bearing pedestals.

But Above All--
DO Specify
And Use

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AIR HANDLING EQUIPMENT

BAYLEY BLOWER COMPANY

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When a Penco dealer calls on you, he knows that he can supply you with *more* than the equipment you need in steel shelving, cabinets and lockers.

Prompt delivery, for instance, because Penco—a division of Alan Wood Steel Company—has an assured supply of quality steel. The Penco dealer represents a firm which has pioneered in sheet metal products since 1879 . . . knows the problems of space and economy facing its customers . . . and has developed units of sturdy construction and *standard* component parts which give you low-cost equipment "custom-tailored" to your needs by the experienced Penco Planning Service, available without charge.

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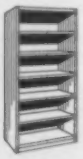

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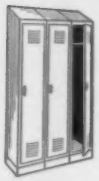

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the Perma-Built Line—enable your dealer to offer you more than 60 types and sizes. You'll find a design that fits your space needs and gives satisfaction to your workers.

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Penco specialists in storage equipment engineering are available—at no cost to you—to assist in planning an efficient, practical shelving installation to meet your needs.

As a division of Alan Wood Steel Co., steelmasters for 130 years—Penco is assured the full supply of high-quality steel which enables it to make prompt delivery on all orders.

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easy reading. The book is liberally illustrated and contains quite a bit of chain engineering data.

Initial chapter is devoted to the history of the chain; this goes back as far as the time of Leonardo da Vinci. It mentions the early McCormick reaper which later made use of chain drives. The historical association of the chain deals with such endeavors as oil drilling, mining, construction, material handling, and machine tools.

In a later section, chain drives are compared with belt and gear drives; advantages of each type of drive is considered. This is followed by a description of roller chains and sprockets and principles pertaining to them.

Other topics given consideration in the book are as follows: design of roller chain drives; installation, lubrication, and maintenance of roller chain; and silent chain drives. An appendix contains answers to roller and chain problems that were presented in two chapters. It also includes a chain glossary.

Safety

SAFETY MANAGEMENT. Size 9¼ by 6¼ in.; 555 pp including index; illustrated; cloth bound. Published by Richard D. Irwin, Inc., Homewood, Illinois. Price $7.80.

SAFE PRACTICE should be the aim of individual workers in industry. In particular, it should be the responsibility of supervisory personnel to foster safety, be observant of dangerous conditions and do something corrective about them. Building a good background on safety should help responsible people in recognizing hazards and promoting safety.

This book covers the subject of safety quite extensively. In it are considered such items as the objectives of safe practice, responsibility for accident prevention and the organization of a safety department. Attention has also been given to the importance of accident costs, and locating and defining accident sources.

Of technical interest, there is a section devoted to accident-producing conditions and their control. This covers layout and design and includes such items as lighting, ventilation, painting and piping systems and, mechanical and electrical hazards.

Some of the other topics considered in the book are as follows: noise control, radiation hazards, atmospheric contamination, personal protective equipment, employee training, control of catastrophes, organizing for fire protection and waste disposal. In an appendix, there are discussions of various industrial substances, their occurrences and effects on the body.

Foot-operated portable elevator in 750-lb. capacity.

"10 and 20 Line" portable hand elevators —wide range of models. Special attachments available.

Portable elevator pulling heavy dies from press bed to elevator.

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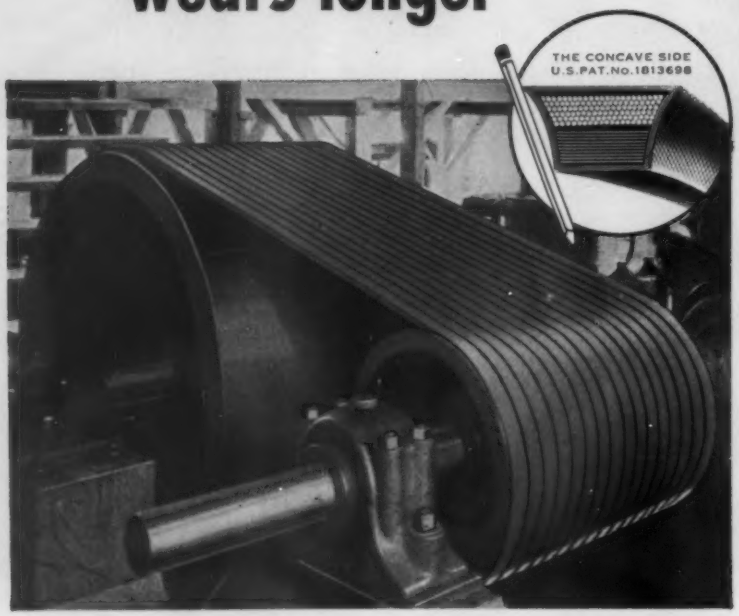
Why a V-Belt with CONCAVE SIDES wears longer



It is easy to demonstrate to yourself why the concave sides (Fig. 1) of the Gates belt greatly lengthen belt life.

Simply bend a Gates belt and feel the sides. Notice how these precisely engineered concave sides *fill out* on the bend and *become straight*. Thus a Gates belt grips the sheave groove evenly (Fig. 1-A) and wear is distributed uniformly across each side of the belt. That means longer belt life; lower costs.

Make the same test with a straight-sided belt (Fig. 2) and see what happens. The sides bulge out on the bend (Fig. 2-A) concentrating the wear at points shown by arrows.

To assure longer wear and keep belt costs down, specify the V-belt with Concave sides—Gates Vulco Rope . . . readily available from nearby distributor stocks. The Gates Rubber Company, Denver, Colorado—*World's Largest Maker of V-Belts.*

Fig 2

Fig 2-A

There are Gates Engineering Offices and Distributor Stocks in all industrial centers of the United States and Canada, and in 70 other countries throughout the world.

TPA 90

Gates VULCO ROPE Drives

For more facts circle 609 on Reply Card

Low Cost Freezer

(Continued from page 93)

nique saves at least 10 per cent in initial cost of construction.

The choice of insulation was especially important to meet the requirements of the new type of construction. Cellular glass insulation, all of it Pittsburgh Corning's Foamglas, was chosen since it has a compressive strength of over 7 tons per foot which allowed the building of self-supporting walls—one of the key requirements. Previously it has given good service in the floors of refrigerated tank rooms. Here the weight of huge stainless steel tanks of stored grape juice demanded an insulation with high compressive strength.

In addition, the material is impervious to moisture, completely fireproof and meets all insurance requirements.

Non-Lubricated Bearings

(Continued from page 121)

sult the bearings and shafts had to be repaired or replaced frequently. Substituting carbon-graphite bearings has reduced the maintenance considerably.

From an operating standpoint, one of the most severe applications of carbon-graphite materials ever attempted was recently designed with the cooperation of the Engineering Department of Riegel Paper Corporation, Milford, New Jersey. This was a journal bearing on the drive end of a spherical rotary digester. The digester is a 14 ft diameter sphere that is loaded with hemp rope and a caustic solution. The sphere is rotated at 1/5 rpm during a 16 hr cycle while steam is introduced through the drive end shaft. Cast iron journal bearings 14 in. by 14 in. were used to support the sphere. The steam passing through the shaft raises the temperatures of the drive end journal to about 300 F. The load per bearing was 32½ ton.

This combination of heavy load, high temperature and low speed caused failure of the lubricant, and the journal was so severely scored after a few runs, that the digester was shut down. To get the machine running again, Riegel had two alternatives. Either they could install roller bearings with a high pressure lubricating system or a carbon-graphite bearing. The latter was chosen because of its simplicity and low cost. Riegel Paper Corporation's Engineering Department designed and fabricated a steel pedestal, and our company supplied a carbon-graphite journal bearing and thrust plate to fit.

This installation was completed in October, 1954, and has been running continuously with no lubrication or maintenance since then.

Triple-Barreled AMVIT* jointed clay pipe line resists chemical attack from industrial wastes

International Business Machines Corporation, Kingston, New York

Contractors

Turner Construction Company
Campbell Building Company

Engineers and Architects

Giffels & Vallet, Inc.
L. Rossetti

THIS triple-barreled Amvit Jointed Clay pipe line now carries thousands of gallons of chrome plating, cyanide, acid and alkali solutions from I.B.M.'s Kingston, N. Y. plant to a nearby treatment plant.

The Amvit Joint was specified for this tough job because like the pipe, it is unharmed by underground service.

Joint is Trouble Free

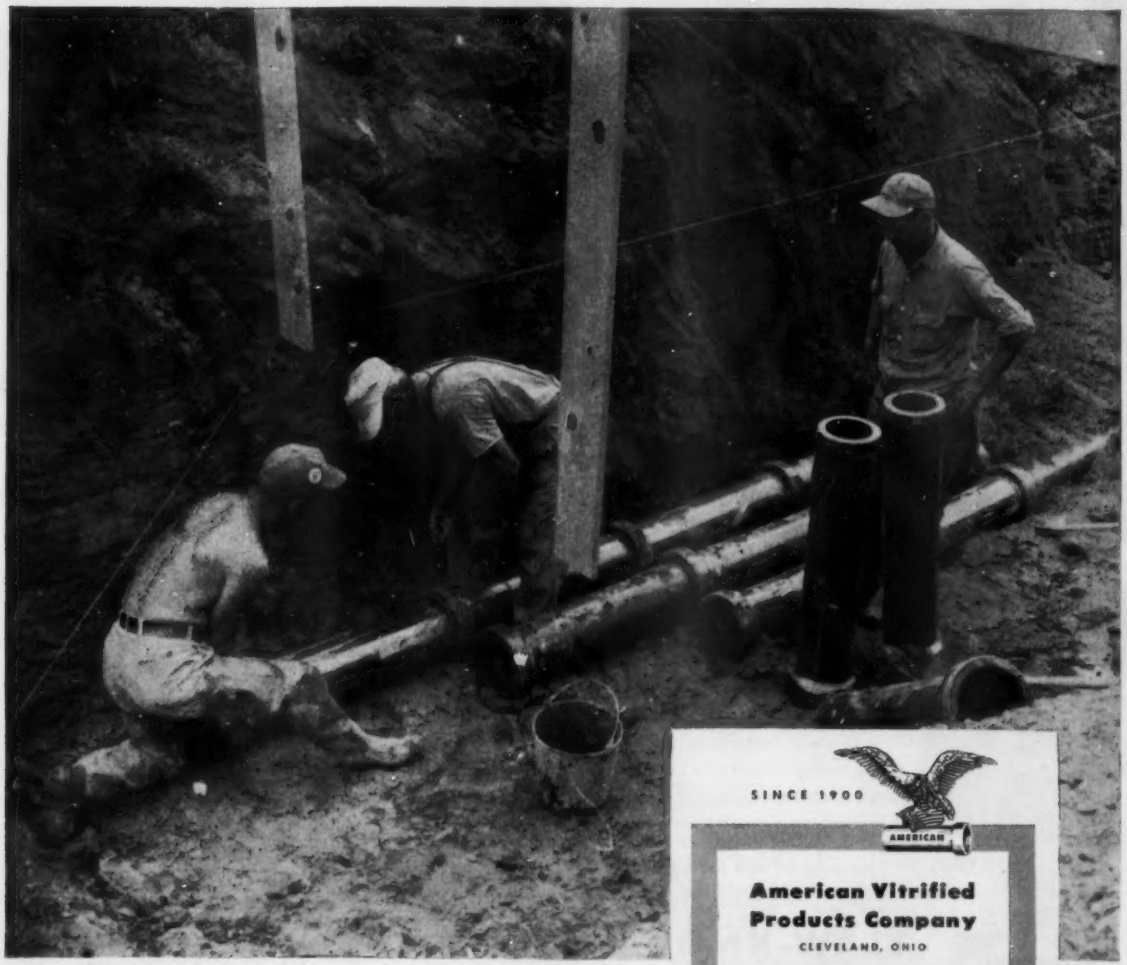
A true mechanical joint, Amvit is made from plasticized resins of polyvinyl chloride. Laboratory tests prove Amvit jointed clay pipe is corrosion proof and resists attack from most acids.

Prevents infiltration, exfiltration

Amvit is a compression type joint on the ball and socket principle. No adhesives or other compounds are needed to make a tight seal. Just push the pipe together and the line is complete. Nothing can enter or leave the line.

Amvit Jointed Clay Pipe, in sizes 4" through 24", together with all fittings is available for immediate delivery in the Northeast and Central States.

For more information, write or call American Vitrified Products Company, National City Bank Building, Cleveland, Ohio, or our office nearest you.



Photograph by Doug Campbell

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AMERICAN

American Vitrified Products Company

CLEVELAND, OHIO

*T. M. Registered. Patents Pending

MANUFACTURERS of: Clay pipe, flue liners, clay liner plates and concrete pipe.

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On stair treads, walkways, catwalks, platforms and floors—both indoors and outdoors—you can provide safe walking conditions. For Blaw-Knox Electroforged Steel Grating brings you these exclusive features:

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Pittsburgh 38, Pennsylvania

GRATING APPLICATIONS: floors • platforms • walkways • catwalks • stair treads • fan guards • shelving • and many other uses, both outdoors and indoors, for versatile steel grating

For more facts circle 611 on Reply Card

Metal Sheath Heaters

(Continued from page 89)

operate over wide ranges of temperature and give excellent control by opening the circuit at the temperature set on the instrument. There are some tricks in locating thermostat bulbs, but these are generally well understood by people who have had experience in making electric heating applications.

The input controller is the second commonly accepted control although it does not control the temperature. In this device a synchronous motor drives a cam operated switch which may be manually set to remain closed during any portion of a 30-sec cycle. Normally operated in conjunction with a contactor, this control when set at 50 per cent, for instance, would energize the heating equipment for 15 sec and deenergize it for the following 15 sec, thus, in effect, giving 50 per cent of normal wattage input without loss in resistance control devices. The input controller is conventionally used on radiant heating applications, the mass of the heating element making only a small change in the average temperature of the process.

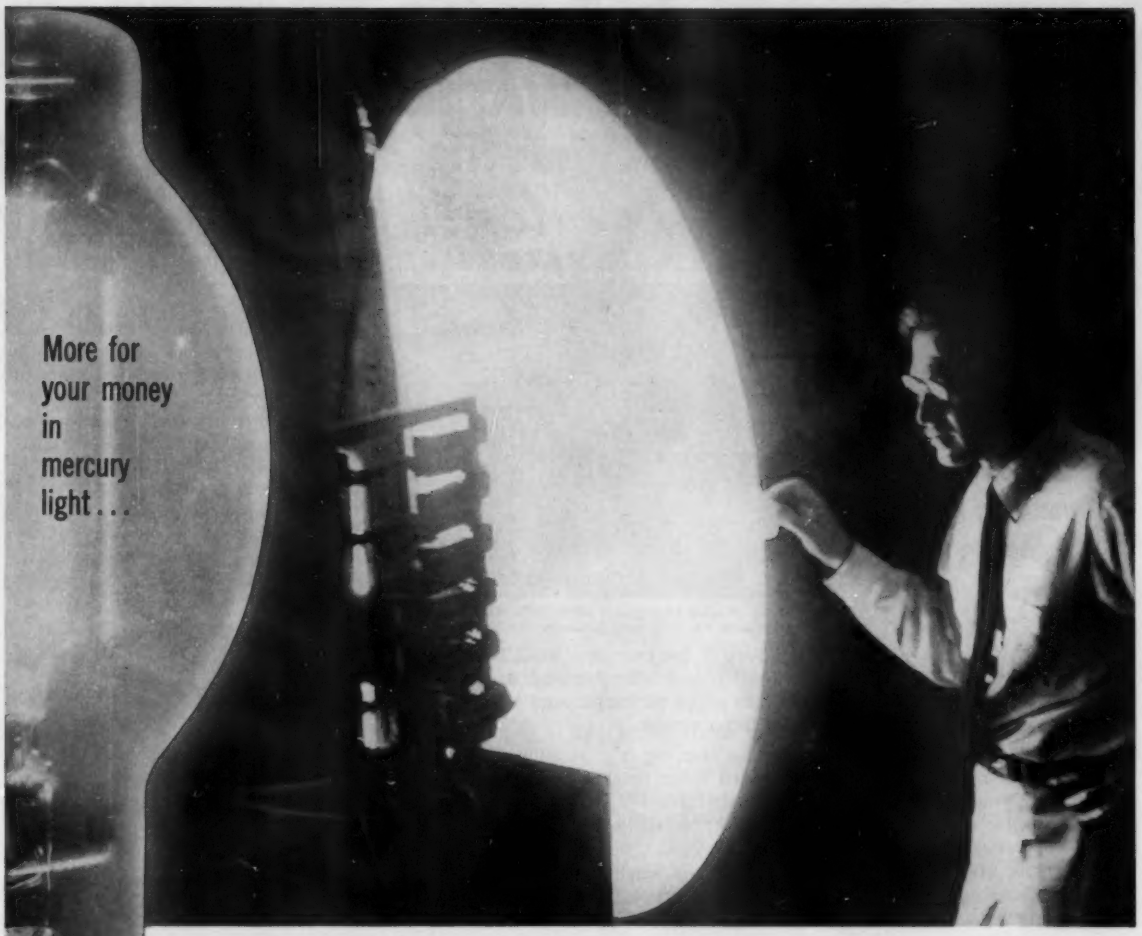
In designing a given installation, it is always necessary to first estimate the kilowatt requirement which must be installed. Once this is accomplished and verified, consideration can be given to the form of heater, the watt density and how the heater will be applied. For instance, heating a liquid in a tank can be accomplished by screw-in plug immersion heaters; by flange type immersion heaters, or by over the side immersion heaters. In another application it might be considered desirable to install a circulation heater and, either by gravity or pump, circulate the liquid from the tank through the heater.

In applying heat to dies or platens, one job may be best accomplished by drilling holes and using cartridge heaters. In another application, clamped-on strip heaters might provide the best answer.

Knowing the kinds of heaters available and the sheath requirements for durability as well as the watt density allowable on the sheath, most applications suggest at least one good solution and one possible solution. In many cases the deciding factor will be what heater is most easily obtained in a standard rating since it is usually desirable to have the installation operating in the shortest possible time.

A correctly engineered and properly installed metal sheath and heater application usually requires little maintenance. However, the plant engineer should be aware of a few points which should insure good service.

If, for instance, a clamp-on installa-



NEW, INCREASED LIGHT OUTPUT FOR 13 WESTINGHOUSE MERCURY LAMPS

Now—through advanced design and manufacturing techniques—the most widely used Westinghouse Mercury Lamps give you more light when *new*, more light *for life*.

Look at the following chart. It shows the new boost in initial light output for just two of the most widely used Westinghouse Mercury lamps . . .

Lamp	Initial Lumens	
	Old Rating	New Rating
400-watt E-H1	20,000	21,000
400-watt J-H1	19,000	20,000

And there are similar high increases for *eleven* other popular Westinghouse Mercury Lamps.

But that's only half the story! For not only do these new, improved Westinghouse Mercury Lamps give increased light output to start with, they also *maintain* higher light output throughout their long life. For example . . .

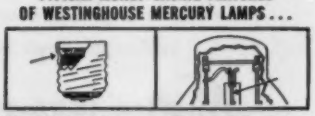
Lamp	Approximate Lumens at 4000 Hours	
	Old	New
400-watt E-H1	15,000	15,800
400-watt J-H1	14,000	14,700

These new Westinghouse Mercury Lamps are absolutely unequalled for *long useful life*. So today, even more than before, Westinghouse Mercury Lamps are by far your best buy for all high-intensity lighting.

This significant advance in Westinghouse Mercury Lamp performance is further evidence of Westinghouse leadership in mercury lighting—one more proof that Westinghouse Mercury Lamps give you *"more for your money in mercury light."*

Westinghouse Guarantees the service life of all its widely used types of quartz mercury lamps. For full details call your Westinghouse Lamp Representative—or write Westinghouse Lamp Div., Dept. 00-0, Bloomfield, N. J. You can be *sure* . . . if it's Westinghouse.

TYPICAL MONEY-SAVING FEATURES OF WESTINGHOUSE MERCURY LAMPS...



Hi-Temp life-time-tight bases—non deteriorating bonding material eliminates costly problems of loose bases, cracked bulbs, breakage when lamps are removed from sockets.

Molybdenum Ribbon Seals—just .005" thick—permit easy expansion and contraction of lead-in wires and bulb material. Result: longer lamp life, fewer early failures.

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Ask about new Westinghouse **WEATHER DUTY (TM)** *Mercury Lamps!*

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At the Heart of most U.S.
HIGH TEMPERATURE WATER Systems

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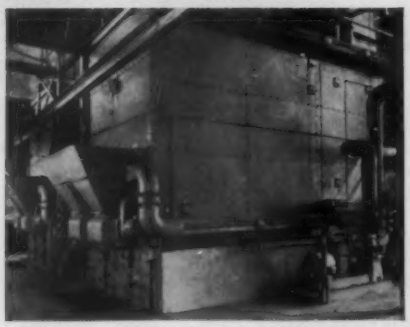
FORCED RECIRCULATION GENERATORS

Here is PROVEN SUPERIORITY based on Operating Performance & Exclusive Features



Two of seven International-LaMont HTW Generators at Lackbourne Air Force Base . capacity 218,000,000 Btu/hr.

- THERMAL SHOCK ELIMINATED by exclusive BUILT IN ECONOMIZER. System return water is circulated through economizer section and brought close to saturated temperature by flue gases BEFORE reaching radiant furnace zone.
- BUILT-IN ECONOMIZER permits safe use of maximum available temperature differential between boiler outlet and system return water. Temperature differentials from 175°F to 200°F are possible and recommended. Result: lower original equipment and operating costs.
- LOW HEADROOM BOILER. Minimum height reduces cost of boiler house construction . . . permits installation in many existing structures.
- MAXIMUM HEAT ABSORPTION with minimum stack losses due to highly efficient MULTI-PASS design.
- LOWER INSTALLATION & MAINTENANCE COSTS. Exclusive unit construction reduces erection costs over 50%. Complete tubular boiler sections fabricated, tested and inspected before shipment.
- OPERATING INSTALLATIONS SINCE 1952 . . . Pressurized furnace or induced draft operation . . . Individual boiler circulating pumps or combined pump system if preferred.
- COMPLETE RANGE OF SIZES. From 6 to 200 million Btu per hour or larger . . . design pressures to 500 psi with corresponding temperatures . . . for firing with any type of fuel.

Get All the Facts

International-LaMont Forced Recirculation Generators are doing an outstanding job in providing economical high temperature water for large area heating, power and process requirements.

Bulletin 700 details the facts. Write for your copy today.

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tion is under consideration, it will be realized that the engineering must lead to careful application of the clamping means and that when first operated heaters will be in close contact with the surface which they are to heat. If the clamping means should loosen, then good contact is no longer maintained and the surface to be heated cannot accept heat from the source. Under these circumstances the source will over-heat and the life of the heater will be shortened.

Immersion heaters in liquids need to be kept clean. When first installed, over the side immersion heaters are usually supported from the bottom of the tanks by means of legs. This permits a limited accumulation of sludge in the bottom of the tank without affecting heater life. If this sludge is not cleaned out, the heaters will eventually be submerged and will overheat, possibly to the detriment of the material being heated and to the heaters. Removal of sludge from time to time will assure satisfactory heater performance.

In maintaining an electric heater installation there is no substitute for periodic scheduling of maintenance operations.

Relatively low cost of installation and control is of primary interest in considering the application of electric heat to any particular process and while the cost of energy to operate the process must always be considered, against these costs must be reflected the benefits, and savings gained. Increased speed of production and greater uniformity of product are frequently the deciding factors in choosing electric heating rather than other methods, in process work.

It makes Its Own Bad Climate

(Continued from page 122)

ture it can hold. Thus, by maintaining a fixed concentration and varying the temperature with standard coolants—F-12 Freon at 12 F in this case—the amount of moisture to be taken from the air can be controlled.

As the solution takes up moisture, it naturally gains in volume. However, a small portion is passed over a steam coil called a regenerator, and when the sump volume increases sufficiently, a float valve admits 25 psig steam to the regenerator and the moisture is "boiled" out of the solution and carried off in a scavanger air stream. Regeneration of only 10 to 15 per cent of the solution serves to maintain the concentration required. Completely automatic regenerator cycle functions while the air washer section of the unit continues absorbing moisture from the air.

In the A. B. Dick Company installa-

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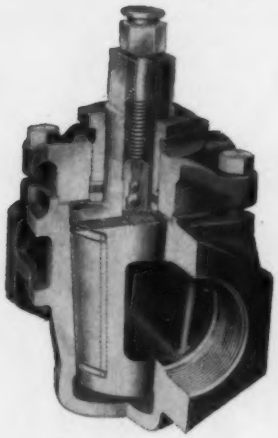

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For forty years, Rockwell-Nordstrom *lubricated* plug valves have been proving that they cut costs by doing their job better, longer, with less maintenance. Here's why:

1. Pressurized lubricant forms a positive, leakproof seal, preventing dangerous or costly leakage.
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3. Costly production loss by stuck valves is prevented. The tapered plug is hydraulically seated for *instant, quarter-turn* operation.

Rockwell-Nordstrom valves cost about the same, often less, than ordinary valves. Their cost to use and trouble-free dependability cannot be matched by any other valve. Available in semi-steel, steel, stainless and corrosion resisting metals, in a full range of sizes to 30″. Send the coupon today for complete details.

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tion, air destined for the dry room is already preconditioned. It is entirely drawn from a large room giving access to all the test chambers and held at a constant 73 F, 50 per cent relative humidity. No air from outside the building is used. The flow chart, Fig. 2, shows the operation of this particular system.

One hundred cfm of this air, containing 62 gr per lb of moisture, is mixed wtih 800 cfm of return air from the dry room at 63 F, 7 gr per lb. The mixture, at a maximum of 64 F, 13 gr per lb, passes through the humidity conditioning unit and emerges at 21 F, 4.9 gr per lb. It is then reheated within the range of 60-73 F (dry bulb).

TV Cabinet Finishing

(Continued from page 91)

The remaining 14,000 cfm of air drawn in by the two air supply systems is distributed among two flash-off tunnels and the graining room where some TV cabinets receive their simulated hardwood finish. One of these tunnels, adjoining the spray booth, comprises the next stage in the finishing operation.

Cabinets spend approximately four minutes in the tunnel. Volatiles contained in the spray coat that has just been applied are vented with the aid of a 24-in. diameter, 2500 cfm exhaust fan. The tunnel has a large window built into the side facing the production floor, which permits supervisory personnel to make a visual check of the cabinets as they move through.

From the tunnel, the conveyor rises approximately 9 ft to the bake oven. By elevating the oven, we were able to obtain two important benefits:

First, the floor space underneath is used for a paint storage vault which otherwise would have required additional space. Second, the elevation produced a natural heat seal at the opening of the oven, thus improving oven efficiency and reducing costs.

The storage vault, since it is located on the production floor rather than in a separate building, reduces the time required to obtain paint. The vault measures 30 by 32 ft, has a 6 in. thick concrete overhead slab and explosion-proof windows. Illumination is provided by vapor-proof lights, and all material handling equipment is grounded and rubber-tired to eliminate sparks.

The convection-type bake oven consumes about 500 therms of gas per working day. Uniform temperatures are maintained by means of ductwork equipped with adjustable dampers. Exterior ductwork was eliminated to reduce heat losses. The 1.8 million Btu capacity heater was factory-assembled, eliminating the need for installing insulation in the field.

Cabinets spend about 20 minutes in the bake oven. During this time, they are subjected to temperatures of 250 to 450 F, depending on the finish involved. Solvents are exhausted by a 3750-cfm fan powered by a 3-hp motor. Oven heat is recirculated by a 22,000-cfm fan driven by a 15-hp motor.

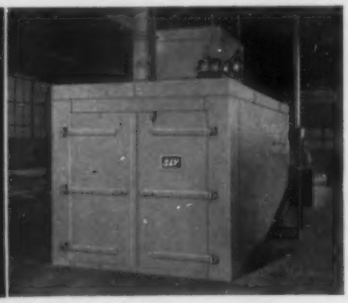
After leaving the oven, cabinets cool off for 15 to 20 minutes. Those that have been enameled are then unloaded, inspected, and shipped to another plant for installation of TV circuitry. The cabinets scheduled for graining are transferred to a second conveyor line, this one 600 ft long, which carries them to one of two graining machines.

The machines are located in a window-enclosed booth similar to the one where the base coat was applied. After graining, cabinets pass through the second of the two flash-off tunnels, into a second oven, and are cooled for 10 minutes. Afterward, a final varnish coat is applied and the cycle is repeated. The grained cabinets are then ready for inspection and installation of electronic components.

Finishing equipment was built by Schmieg Industries, Inc., Detroit, and engineered for the plant by Moeller Engineering and Sales Co.

SLY

Oven Speeds Aluminum Aging



Midwest Aluminum Company, Kalamazoo, Mich., uses a Sly box-type Oven to age 1½ tons of extruded aluminum sections per batch. The Sly Oven is, in the words of the company, an excellent installation. Frequent air changes per minute — so important in aluminum aging — are assured by the correct capacity fan. A uniform 400° F. temperature throughout is maintained by the convection-type heating system, which uses an electric air heater with a total capacity of 120 kilowatts an hour. Heavy insulated panels provide an effective heat seal.

This is another example of the wide variety of work involving baking, drying and finishing to which Sly Ovens are put. *Write for your copy of Bulletin 200,* which describes the complete line of Sly Convectioneered Ovens.

While one carload of aluminum is being heated another car is loaded. The aged aluminum is run out the exit door and the next car moved in to make a continuous operation.

SINCE 1870

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☐ Foot Treadle Dip Tank

☐ Flammables Equipment Selection Chart and Price List

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Company_____

Address_____

City_____ Zone_____ State_____

For more facts circle 617 on Reply Card

Steel Belt Conveyors

(Continued from page 105)

repaired or replaced and precautions taken to prevent a recurrence.

To prolong the life of steel belt conveyors, check the following:

Observe the area about the conveyor for cleanliness. Sometimes, particularly at loading and discharging points, material spills over onto the floor and builds up to the point where it contacts the moving belts, idlers or pulleys, and may cause undue wear. The easiest way to avoid this condition is to prevent excess spillage and to provide for periodic clean-up.

Make sure that hoppers, feeders, take-offs, supports of other equipment such as pipes, conduits, etc., are not placed too close to the moving belt. Such devices should be located several

inches from the edges of the belt, otherwise, there is a chance the belt might rub against them and wear both the belt and the obstruction.

Damage inflicted upon the frame of the conveyor by plant trucks, material placed against it, etc., should not go uncorrected, as it may cause improper alignment.

Again, as with other types of conveyors, the load should be guided onto the belt without undue impact. Gentle feeding of material will contribute to a long belt life.

Sources of squeeking or rubbing sounds should be investigated, and the causes eliminated.

Vapor-Liquid Separators

(Continued from page 107)

per cent hydrogen-nitrogen mixture at 190 psig, 150 F.

Type 316 stainless mesh for 11 ft 6 in. ID water wash tower separates water from 242,000,000 standard cubic feet per day 12.1 molecular weight gas at 285 psig and 110 F.

Steam Drums—In steam drums, the wire mesh separators prevent carry-over and provide steam of better than

There is only one

LIMBEROLLER

**Limberoller is the trade-mark for the flexible belt-conveyor idler made exclusively by Joy Manufacturing Company.*

JOY'S NEW BELT CONVEYOR IDLER

- **Cuts Maintenance Costs**
- **Lasts Twelve Times Longer**
- **Easily Handles Sticky, Corrosive, Abrasive Materials**

The *Limberoller* is a new type of belt-conveyor idler that has been setting length-of-life records wherever used. It has already given over *twelve times* the service life of conventional idlers in handling abrasive foundry sands, coal, petroleum coke, potash, copper ores, copper mill tailings, iron ore, wet concrete, triple super-phosphate, ammonium sulphate and sticky fertilizers. This radical, new idler consists of pressure-molded neoprene or rubber discs on a flexible steel cable. Only two bearings are used and these are up out of the dirt zone.

The Limberoller is unaffected by most corrosives that damage steel . . . is ideal for chemical, sulphur and salt plants.

Get details from *Joy Manufacturing Company, Oliver Building, Pittsburgh 22, Pa.* In Canada: *Joy Manufacturing Company (Canada) Limited, Galt, Ontario.*

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For Air and Gas Compressors, Oxygen and Nitrogen Generators, Vacuum Pumps and Boosters, Conveyors, Fans, Electrical Connectors Hydraulic Fittings and Hose Assemblies.

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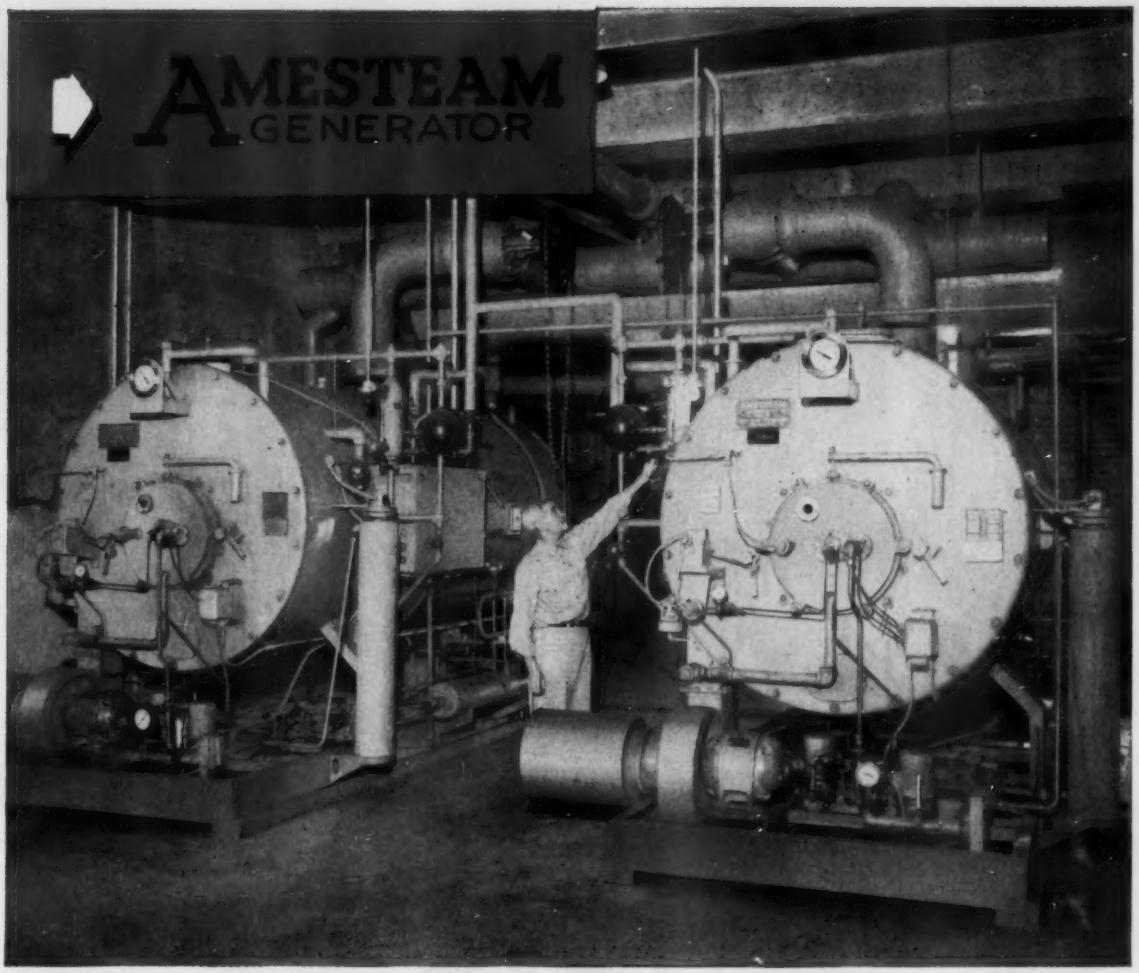

PERFORMANCE that brings REPEAT ORDERS again and again

An AMESTEAM GENERATOR in operation is our best salesman for another. In fact, many of our customers have ordered 10 and more units on the strength of past performance. And this, in spite of lower bids.

Why? Because the AMESTEAM GENERATOR owner knows he has a good thing. He knows he has a quality boiler with all the proved features necessary to give him the economical steam he wants *when* he wants it. He's seen how little maintenance labor the unit requires, and how flexible it is to changing load demands. He's also enjoyed the assurance of expert AMES service, on call 24 hours a day.

Specify AMESTEAM GENERATOR for your power — processing or heat requirements. You won't be buying a cheap boiler. You *will* be buying years of cheap steam.

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Please send me further information on AMESTEAM GENERATORS and name of the nearest representative.

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COMPANY .....

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99.9 per cent quality with total solids less than 3 ppm.

Reboiler—Conical shaped steel demister, approximately 8 sq ft, is recommended for a reboiler handling 12,500 lb/hr propane at 145 psig and —100 F.

Vacuum Crystallizer—Stainless mesh, 8 ft diam, is used to remove entrained caustic solution from 12,000 lb/hr saturated steam at 60 mm Hg abs.

Mist Extractor—Stainless mesh 6 in. by 5 ft 7½ in. in diameter, recovers natural gasoline from 60,000,000 standard cubic feet per day at 235 psig and 60 F.

Vacuum Receiver—Conical stainless elements, 4 in. thick by 44 in. diameter at base by 60 in. high, reduced glycerin carryover to vacuum system hot well from 0.3 per cent to 0.2 per cent.

Britain to Southern Europe

(Continued from page 111)

canals with water taxis and the traditional "free port" make it the Venice of the North.

Rebuilt Hamburg is a beautiful city. The island shipyard, rebuilt in 1950, has launched more than 50 ships of 22,000 tons or over and now has 7 Russian tankers on the ways.

From dinner with plant engineers in Niagara Falls on Thursday to dinner with plant engineers in Berlin on the next Thursday is not a common occurrence. I was there as the official representative of the American Institute of Plant Engineers at the 100th Anniversary of the Verein Deutscher Ingenieure — The German Engineers Society.

From an initial meeting of a few student engineers in 1856, this organization grew to a peak strength of 60,000 and an impressive *Ingenieurehaus* in Berlin in pre-Hitler days. The end of the war left the *Ingenieurehaus* in Russian hands with all records destroyed. From a desk and a chair and one determined man the organization has again grown to about 45,000 with headquarters in Dusseldorf.

From London my route will have circled in more leisurely fashion. to the Ninth Annual Conference of the Incorporated Plant Engineers at Harrogate. Then south in round-about fashion through the industrial section of England and Wales to London.

London is the jumping off place for the International Conference of Large Electric Systems in Paris the early part of June. This ten day Conference, known internationally as CIGRE, will be attended by a large delegation of Americans. It will have run nearly to the start of the Fifth World Power Conference in Vienna.

These two conferences, important from the standpoint of establishing the AIPE as a participant on a par with other engineering societies at international gatherings, hold little for the plant engineer, but are of utmost importance to the industrial and public utilities power engineers.

Following the Vienna World Power Conference, however, we have planned a two week tour through the industrial plants of Austria, Yugoslavia and Italy. The one week available for France and Switzerland was admittedly too fast but time was fixed by the Paris and Vienna Conferences.

From Vienna the trail will lead north and east, on a schedule not yet completed. The tour will involve a number of industrial magazine editors and will be under auspices of the Society of Business Magazine Editors. This is an organization of publications, not individuals, and PLANT ENGINEERING is a charter member.

Next month I will have a short report of the Incorporated Plant Engineers Conference, the ninth of this important organization which has accomplished much in the United Kingdom and has been most cooperative with the American Institute of Plant Engineers in promoting the plant engineer and his activities worldwide.

The round object hanging from the painter's belt is a portable paint heater. This is one of several standard types, any one of which may be used for application of Tygon ATD Hot Spray Vinyl Paint.

Did you know that hot spray painting offers you cost-cutting advantages unequalled by any other method? For instance: When Tygon ATD is hot sprayed, paint loss is very low because there is little overspray. And, since heat replaces thinners, no thinners are needed. Thus, savings on material amount to as much as 20%.

With conventional corrosion resistant paints five to six coats are required to achieve a 5 mil film. With Tygon ATD you build a 5 mil film with just two passes — saving you up to 30% on labor. The Tygon ATD film has excellent adhesion, is smooth and glossy, without runs or sags . . . and it is highly corrosion resistant.

You will want the complete story of how Tygon ATD Hot Spray Paint materially reduces job costs.

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PLASTICS AND SYNTHETICS DIVISION

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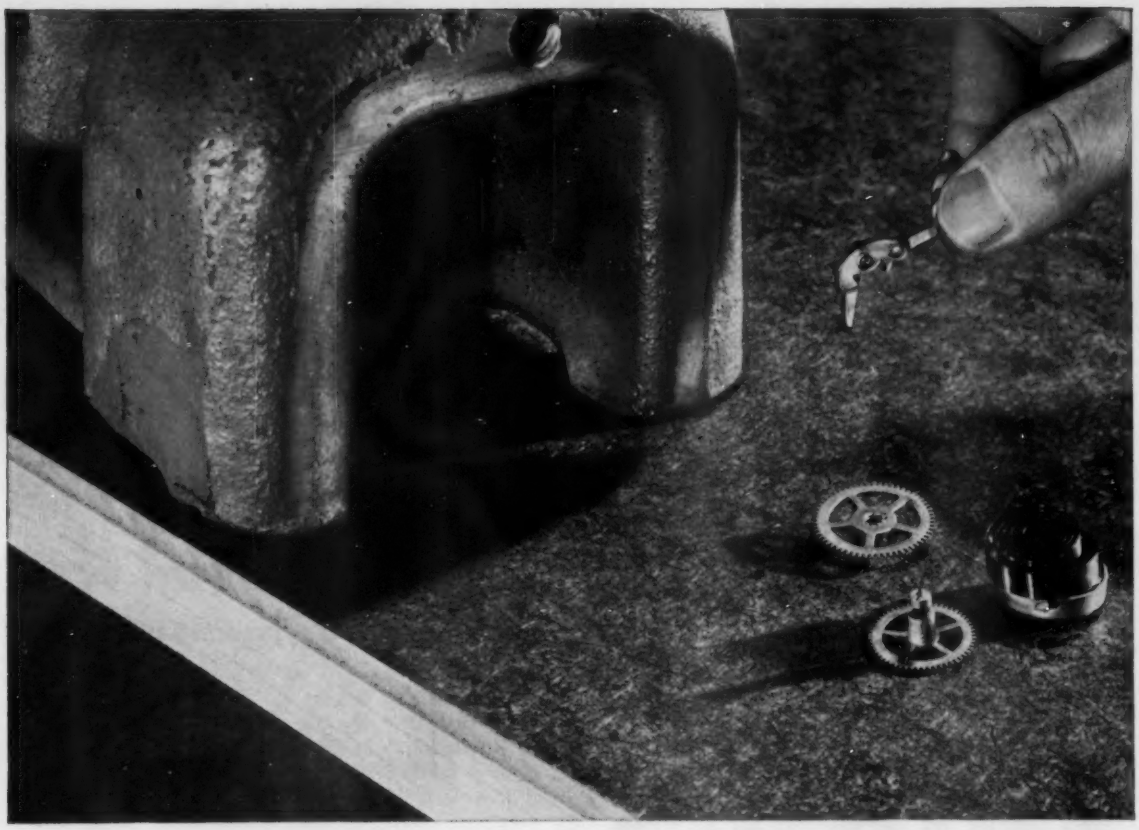

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- workbenches
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- chutes, troughs
- conveyors
- tote trucks, trays
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- drafting boards

So smooth and flat it can't harm highly polished parts. So dense and tough it withstands the impact of heavy metal. So rugged it's a permanent fixture.

Safe? Masonite Tempered Presdwood® won't snag fingers or clothing. Warm to the touch, too. It won't split, splinter or crack...never a crevice to catch dust and germs. A damp cloth cleans it.

Your lumber dealer carries Presdwood in 4′ wide panels, up to 12′ long. They're easily cut and fitted to your needs. Thicknesses of $\frac{1}{8}''$, $\frac{3}{16}''$, $\frac{1}{4}''$ and $\frac{5}{16}''$. Send the coupon for the complete story of Presdwood in the factory.

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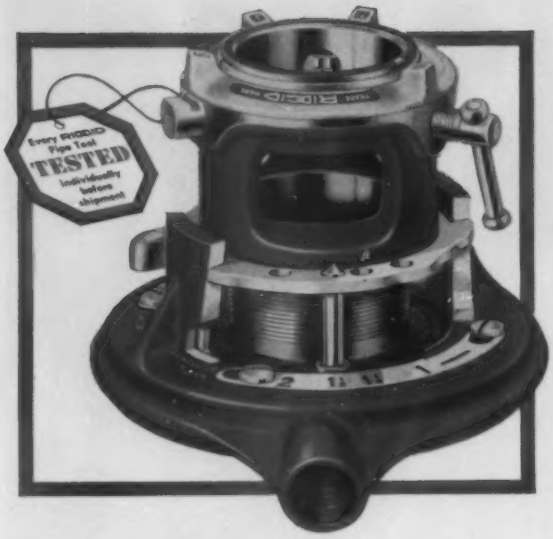

RIDGID

Jam-Proof 65R saves you time, work and mistakes

Ready for work fast—you set 65R to pipe or conduit size in 10 seconds . . . self-contained 1", 1¼", 1½", 2" high-speed steel dies. Self-centering workholder sets to size instantly.

No mistakes—automatic kick-out prevents jamming when standard thread is cut. Workholder setting is mistake-proof.

Beautiful threads—perfectly threaded factory test sample in your new 65R proves it!

You can't beat RIDGID 65R for speed, easy work and long service. *Buy it at your Supply House!*

RIDGID
Work-Saver Pipe Tools

The Ridge Tool Company, Elyria, Ohio, U. S. A.

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R & M All-Weather Motor
Simplified Belt Adjustment
Heavy Gauge Drum
One-Piece Cast Iron Bearing Housing
Cast Aluminum Airfoil Propeller

New Tubeaxial Fan

solves tough air-handling problems

Here is Propellair's new answer to your old problem of handling difficult fume removal safely, efficiently and *economically*. The new Type BT Tubeaxial Fan is specifically designed to handle corrosive and explosive fumes, abrasive dusts, high temperature air . . . all the difficult air-moving problems. New, cast aluminum-alloy, airfoil propeller assures maximum efficiency. Dependable Robbins & Myers motor is protected inside and out against damaging environments. All sizes are available for immediate shipment.

PROPELLAIR "BT" FANS have the unique new features you've been looking for

1. Drum and streamlined belt tube are rolled from 12-gauge steel plate with gas-tight welds . . . no seams to leak or collect corrosive condensate. Clean design assures perfect bond of corrosion-resistant coatings.
2. Versatile motor-mount accommodates a wide range of motor sizes . . . makes motor changes quick and easy.
3. One-piece cast iron housing isolates bearing from the air stream . . . both bearing seats machined at one setting for permanent, perfect alignment.
4. Special high-strength, cast aluminum-alloy propeller . . . higher efficiency and greater corrosion resistance.

Certified Ratings — PFMA

Write for Bulletin 620-PE

R&M **Propellair "BT" Fans**
DIV. OF ROBBINS & MYERS, INC., SPRINGFIELD, OHIO

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BULLETINS

(Begins on page 23)

156 Service Entrance Units — The 1956 Quick Guide, Catalog TCD-17, 36 pp, contains complete pricing information and detailed descriptions of company's service entrance devices for light industrial and other installations. Covers circuit breaker load centers, all-in-one meter socket-load center combinations, fuse puller switches, meter service entrance switches and both standard duty and general use safety switches. Also contains applications and selection data. General Electric Co.

157 On Copper Conductors — Publication C-25, 62 pp, is designed to help make the selection of bus conductors easier. Included in this booklet are tables regarding such shapes as channels, ventilated square tubes and round tubes. There are tables for other rigid bus conductor shapes and also data for bare copper wire and cable as well as for the most commonly used alloy wires. Also provided is a general discussion of copper, its physical and electrical properties. Photos illustrate many installations. The American Brass Co.

158 Tiny Switches — Sixteen-pp Catalog 75 A describes subminiature switches, small enough to hide behind a dime, yet designed to handle high electrical loads on both a-c and d-c circuits. In addition to basic switches, toggle assemblies, rotary selector switches and push-button assemblies, information on many new switches and assemblies is provided in this revised catalog—some 56 switches, auxiliary actuators and assemblies. Micro Switch, Div., Minneapolis-Honeywell Regulator Co.

159 Conductor Systems—This 36-pp catalog describes the Insul-8-Bar systems of mobile safety electrification for cranes, monorails and moving machinery. Includes photos and descriptions of typical installations, engineering data, installation procedure, a photo-text list of all catalog items that comprise these enclosed conductor systems. Catalog also explains how low cost safety is made possible by their simplicity. Insul-8-Corp.

160 Outlets Unlimited—"The Modern Way to Provide Convenience Outlets Unlimited" is the title of 12-pp Form 589, on Plugmold systems. Illustrates and describes five sizes of raceways, with capacities to 10 No. 6 conductors. Shows Plugmold systems for applications in heavy and light industry, offices, others. The Wiremold Co.

161 Receptacles, Plugs—Bulletin 238, 8 pp, describes company's line of receptacles, plugs and binding posts. Illustrates both socket and pin receptacles and socket and pin plugs. Dimensions and capacities are given and prices included. The Standard Electric Time Co.

162 Fibre Conduit — Catalog 52, 12 pp, outlines uses and advantages of company's fibre conduit, an underground protective raceway for electric cables. Includes photos and drawings illustrating important features and typical installations, as well as listing specifications. Orangeburg Mfg. Co., Inc.

163 Ballast Selection Guide — Twelve-pp Bulletin GEC-983H, on fluorescent lamp ballasts, contains new data on weatherproof units. Also provided are wiring diagrams, list prices and electrical specifications. Includes ballasts for general line fluorescents, plastic signs and outdoor applications, dimming and flashing, germicidal fluorescents, rapid start and circline lamps. General Electric Co.

TUBING

164 Stainless Tubing, Pipe—Bulletin TB-355A outlines advantages of stainless tubing and pipe, such as resistance to corrosion, contamination, pressure, temperature, abrasion, and wear. Properties of stainless steels for tubing and pipe are tabulated, and specifications are included. Tubular Products Div., The Babcock & Wilcox Co.

165 Stainless Steel Tubing—Points to be considered when purchasing welded stainless steel tubing are detailed and illustrated in this 12-pp brochure. Treats such topics as process, manufacturer, chemical composition and analysis. Shows how company's Electrunite Enduro stainless steel heat exchanger and condenser tubes are made to conform, in some cases exceed pertinent ASTM specifications. Means by which the tubing is made to achieve uniformity in surface, size, ductility, strength and concentricity are described. Steel and Tubes Div., Republic Steel Corp.

Good Reading on Welding Procedures and Equipment

166 Resistance Welding Guide—Twelve-pp Bulletin 331, "Designers Guide for Electric Resistance Welding," deals with overall design consideration and specific design instruction of resistance welding techniques. Fastening methods discussed are spot, seam, projection and flash-butt welding. Explains and illustrates how resistance welding lowers costs and improves product design. Other factors treated are production rates, labor demands, corrosion and weight, strength and appearances. Sciaky Bros., Inc.

167 Welding Accessories—Catalog 24, 48 pp, describes welding accessories and industrial safety equipment. Covers welding helmets, hand shields, electrode holders, a weld testing machine, face shields and screens, leather and asbestos safety specialties, goggles, filter and safety glass, welding cable and lugs, chipping hammers, wire brushes, and others. Photos, diagrams and tables supplement the text. The Fibre-Metal Products Co.

168 Welding Directory—Twelve-pp Bulletin 156 describes company's line of specially engineered and standard resistance and arc welding equipment. Photos and capsule descriptions of the various type units are given. Acro Welder Mfg. Co.

169 Welding Steel Castings — Recommended practice for the welding of steel castings is fully presented in this 40-pp publication prepared by the Steel Founders' Society of America. Covers welding methods, electrodes, welding procedure for carbon-steel and low-alloy steel castings. Tables listing mechanical and operating characteristics are included. Available to qualified plant engineers, please state your job title. Tempil Corp.

170 Welding Equipment—Bulletin GEC-1033 is a 20-pp buyers' guide for welding equipment. Covers all types of welding equipment, electrodes, and accessories, including a-c and d-c general purpose and industrial welders, semi-automatic and automatic equipment, and carbon block brazing equipment. Ratings, dimensions, and specifications are given, as well as complete description and analysis for electrodes. General Electric Co.

171 Mild Steel Electrodes — Revised "Weldirectory for Mild Steel and Low-Alloy High-Tensile Steels" (No. SB1351) covers newest iron powder and other electrodes. Bulletin provides a description of each electrode, its physical properties and chemical composition, recommended welding procedure, an operator's reference table, and a list of typical applications for each electrode. Photos, drawings and tables supplement text. The Lincoln Electric Co.

BOILERS AND HEAT EXCHANGERS

172 Wet Back Boilers—Catalog AP-294, 8 pp, features 13 sizes of company's 800 Series Wet Back Scotch Type Boilers, specifically designed for use with forced draft oil, gas, or combination gas-oil burners. Describes "wet back" insulating feature, lists ratings, capacities, recommended burner sizes, dimensions and engineering data. Cutaway view shows component parts. Pacific Steel Boiler Div.

173 Heat Exchangers—Eighteen-pp Bulletin M-306 on heat exchangers for process industries, includes design applications and construction details of these standard units. Provides tables of effective surface area available in the various units; tables of overall dimensions; and thermal design data, with tables of film coefficients, pressure drops, fouling factors, and tube characteristics necessary in the solution of basic heat transfer equations. The Lummus Co.

Postage-free Reader Service Cards make it easy to order bulletins. Cards are provided on the facing page.

WATER, WASTE HANDLING

174 On Demineralization — Technical Reprint T-140, 24 pp, a profusely illustrated article on demineralization, discusses advantages and disadvantages of this process for today's power plants. Developments, trends and applications of both multi-bed and mixed-bed ion exchange are considered, and several case histories cited. A comprehensive bibliography lists 119 separate items. Tables, flow sheets, descriptive drawings, performance curves, process selection charts included. Graver Water Conditioning Co.

175 Improved Chlorinators — This Bulletin introduces the V-notch Variable Orifice, described as a new and outstanding development for controlling chlorine gas flow. Illustrates chlorinator and explains design advantages including wide range adjustment of flow, same accuracy over entire wide flow range, others. Wallace & Tiernan Inc.

176 Waste Treatment—Bulletin 850-B describes the Cyclator Clarifier and contains flow diagrams and descriptions of many waste treatment systems involving chemical precipitation, coagulation and sedimentation. These include wastes from metal finishing plants, oil refineries and paper mills. A companion bulletin, No. 6051, on the Sediflotor Clarifier, discusses application of flotation to industrial waste treatment. Points out applications in recovering paper mill fibers, oils, greases, and in treating wastes from paper mills, canneries, packing houses, refineries. Infilco Inc.

177 Mixers and Coagulators—Bulletin W-700, 8 pp, is designed to eliminate the guesswork in selecting liquid mixing and coagulating equipment. Advantages of Vorti mixers and Vorti-Floc coagulators are outlined, and suggested specifications are given. Selection table is included. Infilco Inc.

178 Filter Underdrains — Information on filter underdrains and underdain blocks is presented in two new bulletins. No. 901-B, 8 pp, describes the primary and secondary distributing system, typical installations, performance and specifications. Bulletin 6220-B covers filter underdrain blocks. Infilco Inc.

TOOLS AND MACHINE SHOP EQUIPMENT

179 Electric Tool Guide — Company's line of Silver Line and Speed Tool electric tools is described and illustrated in 44-pp Catalog 39-C. Complete specifications are given on tools introduced in recent months. A typical page shows an actual photo of a basic tool, and illustrates it in use, along with descriptive matter on the tool and its related models, specification tables and other data. There is a full listing of attachments, accessories and replacement parts. Thor Power Tool Co.

180 Turret Lathes — Bulletin 1174-B, 18 pp, describes features, accessories, tools and floor plans for company's line of ram type turret lathes. Photos illustrate important features, and specifications are included. Gisholt Machine Co.

181 Lathes, Shapers—Sixty-six models of screw cutting and turret lathes, including cabinet models, pedestal base models and floor and bench models, are described in this 24-pp catalog. Lathes range in size from a 14-in. swing model through 12- and 11-in. swing lathes with 1-in. collet capacity, and an enlarged group of 10- and 9-in. swing lathes with ⅝-in. collet capacity. In addition to the lathes, catalog gives specifications and details on 8-in. shapers. Attachments and accessory equipment are also described and illustrated. Logan Engineering Co.

182 Toolholders, Inserts—Catalog VR-437, 24 pp, describes toolholders and carbide inserts. Covers both positive and negative rake toolholders using standard inserts up to 1½

BULLETINS

(Begins on page 23)

in. long. These toolholders handle an estimated 90 per cent of all machining operations. Includes illustrations of various styles of toolholders to replace standard brazed carbide tools plus physical dimensions, ordering information. Recommendations covering carbide grades to use for various machining operations on different materials are also provided. Vascoloy-Ramet Corp.

183 Metalworking Machines — Precision metalworking machines for a variety of forming, cutting, punching and notching operations in medium and light weight materials are described in 44-pp Bulletin 56-23-LP. Arrangement of machine specifications and material forming capacities is in tabular form, and cost information on standard press brake dies as well as show press brake engineering tables inoluded. Other features are case histories on use of die-less duplicating techniques, photos and descriptions of new products, listing of accessories. O'Neil-Irwin Mfg. Co.

184 Vinyl Machinery Mount — Advantages of company's vinyl machinery mount are outlined in this illustrated brochure. Installations in a representative plant are shown. Clark, Cutler, McDermott Co.

185 Detergent Oils—How to clean sludge out of hydraulic and lubrication systems without shutting down machines is told in Technical Bulletin 44. Also tells how continued use of these highly detergent oils keeps equipment as clean as new. Sun Oil Co.

OTHER EQUIPMENT

186 High Speed Turbines—Bulletin GEA-6232, 28 pp, describes mechanical drive turbines, operating at speeds ranging up to 10,000 rpm and above. Construction and design features of turbines for centrifugal compressors and blowers are covered, and cross sections, schematic drawings, cutaways, and typical installation photos point out design features and applications. Operation and arrangement of the governing system for close speed control is also discussed, and steam rate tables and curves included. General Electric Co.

187 Improved Storage Units — Bulletin PSU-220, 6 pp, discusses use of Permaglas mechanized storage units in handling free-flowing bulk materials faster, safer and at lower cost. Typical intallations, involving storage of feed, wood flour, starch, others, are pictured. These units are of glass-protected steel, inside and out, and bulletin gives specifications for 14-, 17- and 20-ft structures. Harvestore Div., A. O. Smith Corp.

188 How to Use Sandpaper—This 16-pp pocket-size booklet offers help in choosing and correctly using proper sandpaper for surface finishing of wood, metals and plastics. Identifies five kinds of grain available and describes their properties. Tables show recommended sandpapers and grit sizes for floor sanding and for hand and machine sanding or polishing. Text is illustrated with photos and drawings. Behr-Manning.

189 Refrigerating Machine—Bulletin 1426, 8 pp, describes single-stage hermetic centrifugal refrigerating machine for comfort air conditioning and process air conditioning. Cutaway photo illustrates design and operation features. American Blower Corp.

190 Torque Manual — The 28-pp second edition of this company's popular torque manual includes additional torque application formulas. There are more suggested torque application illustrations. New tables show screw torque data including minimum torsional strength tabulations, torque and tension relationship charts for high tensile and mild steel screws and torque conversion tables. Explanations and solutions to adapter problems and illustrations of special torque wrench adapters and attachments, and information on general principles of torque wrenches are presented. The P. A. Sturtevant Co.

191 Cylinder Mountings — Bulletin 76 describes advantages and applications of company's cylinder mountings to compensate for misalignment. Dimensions are listed on tables. Hanna Engineering Works.

192 Socket Screw Standards — Thirty-pp Form 877—punched for loose-leaf binding—carries easy-to-read tables showing size ranges and specifications such as number of threads per inch, length, and quantities per package for Unbrako socket head cap screws in regular, giant and microsizes; regular microsize socket set screws; button head socket cap screws; socket head dryseal pressure plugs; precision ground dowel pins; and socket screw keys. Standard Pressed Steel Co.

193 Steam-Activated Nozzles—Bulletin Supplement 3A describes sparger nozzles, direct contact steam jet devices designed for submergence in liquids to be heated. Literature supplements a previously issued Bulletin 3A on steam jet heaters for liquids. Application, construction, operation, installation, and sizes are covered. Schutte and Koerting Co.

194 On Pre-Cast Stacks—This 80-pp engineering file on company's pre-cast insulated stack is indexed into four categories; general information; specifications and ordering data; installation instructions, including guying methods; and performance and physical characteristics, including test data. The stack described is an all-fuel pre-cast refractory stack for use with boilers, furnaces, ovens and incinerators where flue gas temperatures do not exceed 1600 F for continuous exposure. Book is available to qualified plant engineers; please state your job title. Van Packer Corp.

195 Nondestructive Testing — Eight-pp "Lower Manufacturing Costs," offers a new look at non-destructive testing systems. Examines testing as a production tool, and presents some of the philosophy behind use of test systems in manufacturing. Several case histories are used to illustrate the ideas in concrete form. Magnaflux Corp.

196 Versatile Chemical—HET (R) Anhydride is the subject of 17-pp Bulletin 43. Describes general properties, typical reactions and suggested uses. Defines its properties as a hardener or curing agent for liquid epoxy

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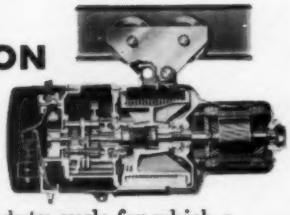

Fine balance and heavy duty design make possible the continuous handling of tough jobs on any duty cycle for which a 30-minute NEMA motor is satisfactory. All gears and pinions are alloy steel, heat-treated. Their ductile core supplies shock resistance to most severe service stresses. Anti-friction bearings throughout.

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Strength of gear teeth of WRIGHT Frame 2 and 3 Speedway hoists has been doubled by a change in contour and grain structure of the metal. Internal gear ring with heavy flanged cross section is bolted to drum at six points and provides extreme resistance to distortion.

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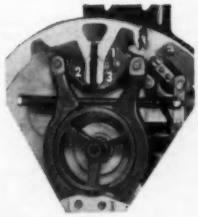

There is nothing to adjust but the cam to keep brake in perfect adjustment. When excessive load drift occurs... remove the screw shown at Position 1, swing the cam until Position 2 is in line. Replace the screw. Position 3 is provided for the final third of brake lining wear. Brake springs and solenoid never need adjustment.

Better performance at lower cost by using WRIGHT units for local-built cranes

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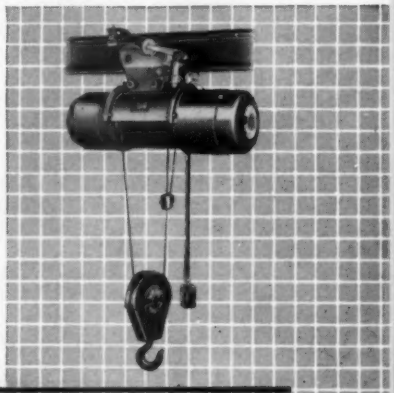
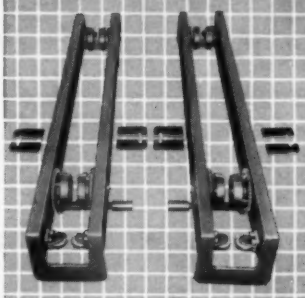


Available in Frame 1, 1½, 2 and 3 sizes with capacities from ¼ ton to 10 tons.

END TRUCKS FOR ALL TYPES



For motor-driven cranes and hand traveling cranes—both top running and under-hung types. Timken bearings throughout. Wide range of capacities.

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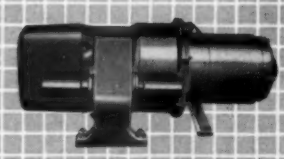

Designed for crane and double-beam trolley propulsion. WRIGHT Crane Drive Unit consists of an electric motor with a fluid coupling transmitting power to a well proportioned gear reduction. Size 1—with motors to 2 HP. Size 2—with 3 to 7½ HP motors.

for complete information on **WRIGHT** *Hoists and Crane components ask for:* ***Speedway Hoists:*** *(Frame 1) Booklet DH133B, (Frame 2 & 3) Catalog E55A.* ***Motor Driven Cranes:*** *Underhung, Single Bridge, Bulletin #227; Top Running, Bulletins #DH448 or DH449 •* ***Crane Drive Units:*** *Booklet DH-431A •* ***Hand Traveling Cranes:*** *Bulletins #DH-468 and #DH-348B*

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AMERICAN CHAIN & CABLE

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Better Value

BULLETINS

(Begins on page 23)

resins with respect to strength and stiffness at high temperatures, fire resistance, high heat distortion temperatures, and excellent mechanical and physical properties. Major fields of applications where these properties can be utilized are outlined. Hooker Electrochemical Co.

197 **Hose and Belting**—Form 3765-R, 8 pp, features descriptive data on various types of hose, conveyor and elevator belts, transmission and V-belts, sheet packing and chute lining, and friction materials. Thermoid Co.

198 **Electric Generating Plants**—Form A428-356, 8 pp, describes company's line of electric generating plants, including one-cylinder air-cooled, two-cylinder air-cooled, four-, six- and eight-cylinder water-cooled models and air-cooled diesel models. A detailed selection guide, giving model number, description, starting method, type of engine and dimensions and weights of each plant is included, as well as listing of optional accessories available. D. W. Onan & Sons Inc.

199 **Excavating, Conveying**—Catalog Section A, 30 pp, gives full details and specifications on Dragscraper machines for low-cost excavating and conveying. Data on standard installations from ½ to 3 cu yd and rapid shifting Dragscrapers in sizes from ½ to 5 cu yd are given, and typical installations are shown. Track cable machines and tower excavators are covered. Sauerman Bros., Inc.

200 **Quenching Oil**—Technical Bulletin 45 describes Sunquench 78—company's new fast quenching oil. Explains mechanism of quenching, and tells how Sunquench 78 gives deeper and greater hardening of low-alloy steels and reduced distortion of irregularly shaped parts. Sun Oil Co.

202 **Masking Tapes**—This brochure on all-purpose masking tapes stresses primary considerations in designing a tape for efficient masking, including stain resistance to all but a few special finishes and heat resistance for bakes up to 300 F for 20 minutes. Describes various applications. Permacel Tape Corp.

203 **Silicones For Shell Molding**—Silicones particularly effective as release agents in shell-mold manufacture are described in 8-pp Bulletin F-8271B. General properties and uses are outlined. Silicones Div., Union Carbide and Carbon Corp.

204 **Metal Finishing Standards**—This 12-pp booklet covers plating and surface treatment of company's products. A section is devoted to general facts on metal finishing, with a discussion of purposes for various types of finish, thread fits, formulas for calculating thread sizes before plating, hydrogen embrittlement. A second section, in tabular form, covers types of plating, with a statement of advantages and limitations, applications, specifications and appearance of each type. A third section deals with types of surface treatment. The Allen Mfg. Co.

DATA FILE of literature for the plant engineer's library

STANDARD CATALOGS, bulletins and handbooks are listed to help plant engineers maintain a permanent file. To get these free catalogs, circle item numbers of those wanted on postage-free cards provided for you on pages 187-188.

MECHANICAL POWER TRANSMISSION

301 **Roller Chains, Sprockets**—Catalog 754, 64 pp, describes, illustrates a line of roller chain stock sprockets, including minimum bore sprockets for reboring, also finished bore and Taper-lock bushed sprockets which are ready to use. Tables show speed ratios for sprocket combinations, standard keyways and setscrews. Includes chain selection and application data, installation and lubrication recommendations, chain length calculations, dimensions and price lists for single and multiple strand roller chains. Diamond Chain Co.

302 **Sprockets and Chain**—Bulletin A-624 24 pp, is compiled to provide plant engineers with all data required for selecting and ordering roller chain and sprockets. Devotes a page to Taper-Lock sprockets for each size of chain from 40 to 100, giving sectional drawing, dimensions, number of teeth, maximum stock bore available, weights, prices and other data. Another page covers Taper Lock bushings; and full information is given on riveted and cotter-type roller chains. Dodge Mfg. Corp.

303 **Power Transmission Equipment**—Form 118, 24 pp, gives descriptive and technical information on variable speed pulleys, wide V-belts, sheaves, motor bases, countershafts, and Select-O-Speed transmissions. Illustrated with photos and dimensional drawings, booklet provides ratings, sizes, application and installation tips. Lovejoy Flexible Coupling Co.

304 **Fluid Couplings**—Bulletin 144-D, 14-pp, presents complete installation and performance data on fluid couplings. Illustrated with diagrams and drawings, bulletin shows ease of applying company's fluid couplings on any type industrial equipment, powered by any type electric motor or internal combustion engine from ¾ to 850 hp. Describes standard models providing standard input, output combinations, and standard models in packaged units. Installation hook-ups are given, along with typical applications. Twin Disc Clutch Co.

305 **Flexible Couplings**—Condensed Engineering Catalog 51-A contains excellent data on the choice and use of company's flexible metal couplings for power transmission. Tells advantages of these couplings and discusses design principles. Double-flexing and floating shaft types, light duty couplings and types for special applications are described and pictured in detail. Thomas Flexible Coupling Co.

306 **Improved V-Belts**—This literature on company's Vulco rope drives explains how this rope with concave sides is designed to fill out to a precise fit in the sheave groove, to provide less wear, more pulley contact and more sure power when needed. The Gates Rubber Co.

307 **Adjustable Speed Drives**—Bulletin PB-4700-1 describes company's packaged adjustable speed drives—covering latest developments in design and construction. Tells how these packaged, pre-wired, pre-assembled units provide flexibility of d-c motor performance from an a-c power supply, and offer simple, convenient speed adjustment without intermediate speed changing equipment or line shafting. Crocker-Wheeler Div., Elliott Co.

ELECTRICAL

308 **Variable Speed Motors**—Sixteen-pp Bulletin 1797, revised, outlines many reasons why variable speed motors can be used to improve production, and it includes illustrations of all types of company's Varidrive motors, as well as their mechanical features, remote controls; etc. U. S. Electrical Motors, Inc.

309 **Motor Buying Guide**—Bulletin GEC-1026, 28-pp, features company's standard a-c fractional and integral horsepower motors in most general use. Included are general- and definite-purpose, fractional horsepower motors, and fhp gear motors. A section on selection of integral horsepower motors covers horsepower requirements, enclosures, starting current limitations, speeds, motor types, and selection of fuses and circuit breakers. Descriptions and specifications cover single-phase, polyphase, totally enclosed fan cooled, and gear-type integral horsepower motors. Photos, ratings, dimensions, weights, frame numbers, and modifications included. General Electric Co.

310 **What You Should Know About Circuit Breakers**—Sixteen-pp Manual 101 explains operating principles of basic circuit breaker designs and provides engineering data on factors of application. Includes simplified diagrams of three basic types. Illustrates with colored charts and diagrams, explains temperature factors, inrush current effects, tripping and reset time. Heinemann Electric Co.

311 **Control Relay**—Eight-pp Bulletin PL 7305-PM describes company's line of control relays, designed to occupy minimum panel space, and available in models with from two to 12 poles. Pictures 10 models, gives dimensions, enclosures, features, and data on maintenance and pole conversion from normally-open to normally-closed; and lists literature and template kits available. Clark Controller Co.

312 **FHP Manual Starters**—Bulletin 224 is a folder giving the features and ratings of a line of fractional horsepower manual starters. Lists applications for them. Square D Co.

313 **Testing Instruments**—Bulletin 19-56, 16-pp, features company's electrical testing instruments, including ohmmeters, ground testers, dielectric test sets, motor rotation tester, cable fault locating equipment, transformer turn ratio test sets, corona test equipment, frequency meters, tachometers, others. Includes photos and descriptions of each type, including chief features, operating ranges, and suggested applications for them. James G. Biddle Co.

314 **Enclosed Switches**—Catalog 83, 28-pp, describes in detail enclosed switches for industrial applications. Included are general switches designed for use on either a-c or d-c purpose switches, sealed switches, heavy-duty limit switches, hand operated switches, and maintained-contact switches, all of which are available in a variety of actuator designs, contact arrangements and electrical ratings. Photos, dimensional drawings, circuit diagrams, electrical data are included. Micro Switch, Div., Minneapolis-Honeywell Regulator Co.

315 **Commutator Slip Ring Maintenance**—This practical little 40-pp handbook gives procedures and methods for commutator and slip ring maintenance. Generously illustrated with photos and sketches, booklet contains sections devoted to common troubles and their corrections; brushes; general maintenance; and company's products for maintenance of commutators and slip rings. Defines commutator terminology. Ideal Industries, Inc.

316 **Panel Components**—Bulletin EE-120 is a 54-pp panel builders handbook of electrical components, containing specifications, diagrams, dimensions, photos and price lists of company's motor control. Profusely illustrated with photos, dimensional and wiring diagrams, bulletin covers manual starters, relays and contactors, magnetic starters in non-reversing, reversing, and multi-speed types, and a group of accessories which include thermal overload relays, oil tight pushbutton units, limit switches, timing devices, solenoids, electrical interlocks, and solenoid-operated brakes. Cutler-Hammer, Inc.

317 **Wire and Cable**—Bulletin 1096, 16-pp contains detailed information on electrical wire and cable, as well as insulation and protective covering. Two selection charts—one by application and environment and one by cable type—are a practical guide to selection of best cable for a particular application. Minimum standard industry specifications are listed. Trade names are also given. The Okonite Co.

318 **Aluminum Conduits**—Bulletin 2681, 24 pp, lists copper-free aluminum conduits designed to resist corrosive action of many chemicals in highly corrosive locations. A pictorial index and price list cover the various types available. Crouse-Hinds Co.

319 **Battery Manual**—Battery selection techniques are emphasized in 20-pp Bulletin 210, a revised edition of this manufacturer's manual on storage batteries for stand-by power, emergency lighting and switchgear applications. A discussion of charging equipment and simplified battery maintenance procedures is included. Storage battery installation procedures are described and illustrated by photos. Exide Industrial Div., The Electric Storage Battery Co.

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It's not very likely . . . but, if an oiler ever *should* attend a board meeting he might tell management some things they should know. He might tell of problems in keeping vital machines lubricated . . . of keeping them running at peak efficiency. He might tell of lost manhours and machine downtime. He might tell of hidden losses that executives would recognize as symptoms of old-fashioned lubrication. Maybe *your* oiler could tell you of losses in *your* plant. Think it over! And if you decide that your production costs are too high because of "lube" problems, you might find it interesting to learn how Alemite can help you.

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DATA FILE

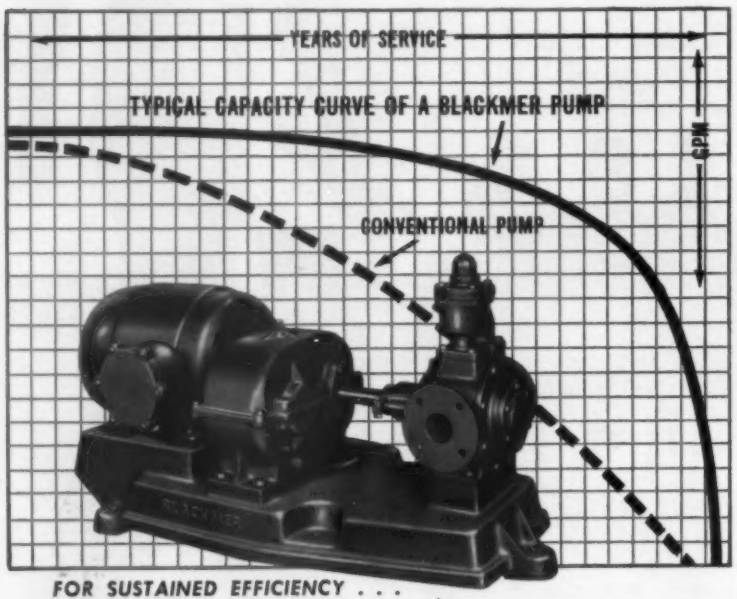
(Begins on page 192)

320 Handbook on Storage Batteries—This 64-pp booklet of instructions and technical data is the sixth edition of this company's battery service manual. Provides a brief treatise on the theory of the lead-acid battery. Gives detailed instruction on the care and operation of batteries, on maintenance and repairs, and on standard and special parts. Booklet is of special value to plant engineers concerned with storage batteries for cycle service in industrial trucks and materials handling equipment. Gould-National Batteries, Inc.

321 Motive Power Batteries — This 48-pp general service manual on lead acid batteries for all types of motive power application is a practical guide to industrial cycle service, including industrial truck, air conditioning, and others. Includes photos, charts, tables, methods of repair, maintenance and theory of operation, instructions covering repairs with regular or special tools, simplified testing methods, including safety practices, acid handling precautions, and charging methods. C & D Batteries, Inc.

322 Flexible Cords — This well-illustrated 24-pp booklet includes all new Underwriters' classifications for flexible cords manufactured by this company. Featuring data on Dynaprene and rubber jacketed cords as well as braid covered types, also gives tips on how to select proper cord. Whitney Blake Co.

323 Cable Troughs—This 12-pp catalog offers a simple solution to any design problem of change of direction or elevation with a complete set of standard fittings, horizontal elbows, inside and outside vertical elbows, ties, crosses, covers and many special fastening devices to save time and labor. Contains full instructions for installations, load charts, accessory items, some typical installations and full list of distributors. The Globe Co.



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LIGHTING, COMMUNICATIONS

324 Fluorescent Lighting—This 24-pp fluorescent lighting guide book is a reference digest on fluorescent products. Gives advantages of this type of lighting; summarizes various lamps and parts, including starter sockets, lampholders. Includes reference chart for lamp performance when interchanged with typical ballasts. Sylvania Electric Products Inc.

325 Guide to Luminaires — Pocket-size, 28-pp Bulletin B-5799-BB covers fluorescent luminaires for industrial and other use. Summarizes salient features of each type of luminaire as it discusses electrical characteristics, maintenance and mounting data, details of construction, dimensions, and recommendations for application. Also contains a pictorial guide to floodlights and incandescent luminaires for industrial and other use. A 4-pp tabulation of buying data concentrates information needed for procurement. Westinghouse Electric Corp.

326 Industrial Lighting Units—The 36-pp 1956 Edition of the RLM Standard Specifications for industrial lighting units contains important revisions in specifications on both incandescent and fluorescent industrial lighting units, as well as new lighting data of special value to specifiers. Most important of the changes and additions are new coefficient of utilization tables for eight incandescent and fluorescent lighting units. Calculations are based on latest Zonal Method of computing coefficients of utilization and illumination on room surfaces. Also included are revised light distribution curves on RLM fluorescent lighting units. RLM Standards Institute, Inc.

327 Plant Lighting Planning Guide — This 32-pp handbook of industrial lighting presents economics of a plant lighting program in terms of lower production costs, reduced working time, less fatigue and eyestrain, less spoilage, fewer accidents, better morale. Explains six major steps in initiating, developing and carrying out a lighting program; tells how to select equipment and stresses importance of maintenance. Includes table of recommended levels of illumination for industrial interiors. Benjamin Electric Mfg. Co.

328 Industrial Lighting Equipment — Technical data on company's CFI-10 and CFI-25 industrial lighting equipment with porcelain enamel reflecting surfaces is featured in two new illustrated bulletins. Chief design features are pointed out and dimensional data are given. Day-Brite Lighting, Inc.

329 Signal Equipment — Tips on how to select suitable signals for any specific operation are offered in one of a series of bulletins—Nos. 100-125—bound in this 40-pp catalog. Other bulletins describe horns, bells, warning lights, other signal equipment. Specifications, photos, wiring diagrams, dimensions, audibility rating charts, electrical characteristics and other data included. Federal Sign & Signal Corp.

INSTRUMENTS, CONTROLS

330 Automatic Controls — Mercury-switch equipped controls for heating, refrigeration, air conditioning and other industrial uses are presented in 52-pp Catalog 856. Fully illustrated, book provides ordering and application information on a variety of pressure controls, temperature controls, level controls, limit and fan controls, and many others. Also presents data on relays, and on tilting-type and magnet-operated mercury switches. The Mercoid Corp.

331 Versatile Electronics—How flexibility of electronic temperature controls makes them useful in a wide range of heating and air conditioning installations is explained in this 16-pp booklet, Bulletin SA-2681. Purpose of publication is to fill the gap between the theory of electronic bridge circuits and specific control layouts and circuit diagrams. Four basic features that give electronic control its flexibility and application to a wide variety of installations are described. Minneapolis-Honeywell Regulator Co.

332 Service Regulators — Revised Bulletin 1026, 20-pp, features company's line of service regulators. Rate-of-flow graphs illustrate mathematically the determination of maximum outlet pressure build-up and amount of gas relieved to atmosphere by extra safety device in case of failure of regulator. Rockwell Mfg. Co.

333 For Industrial Metering—Practical selection and application data on meters for in-

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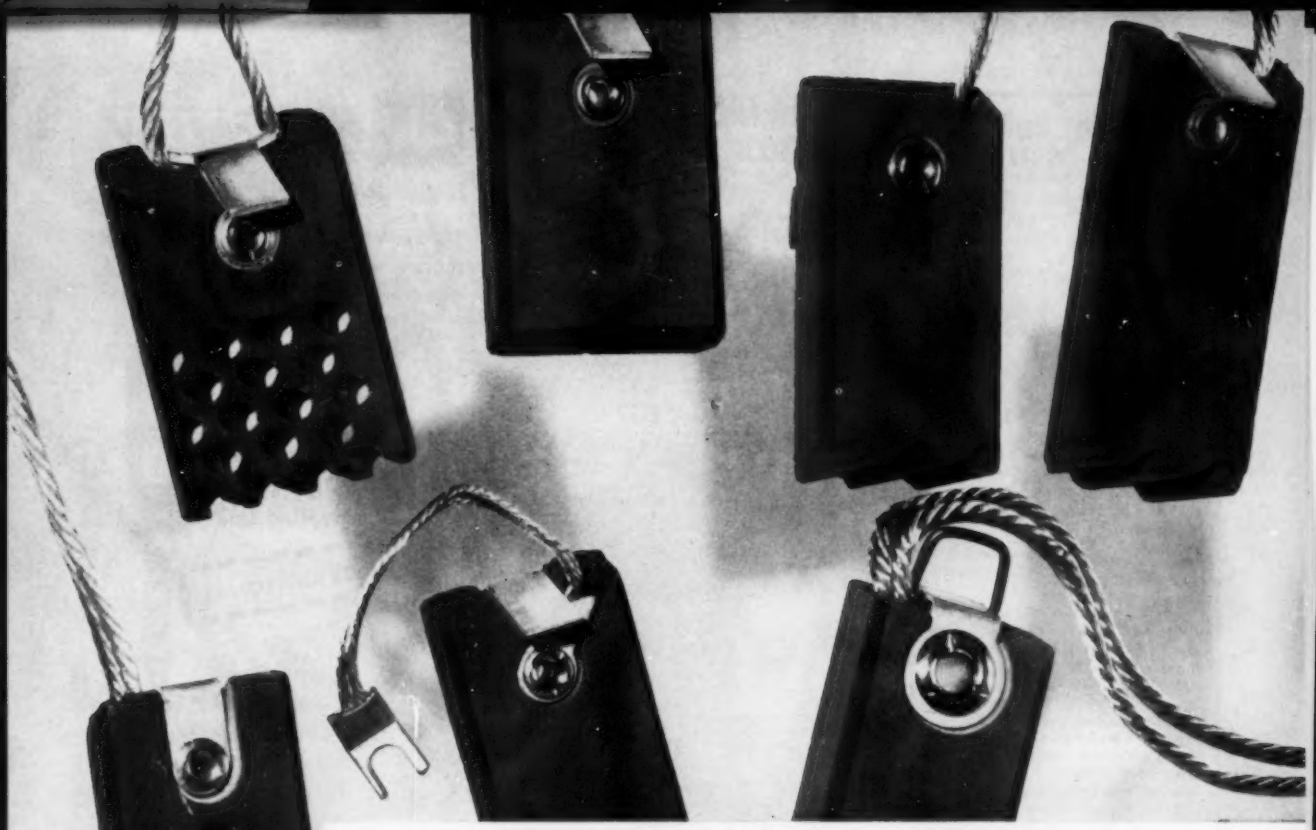

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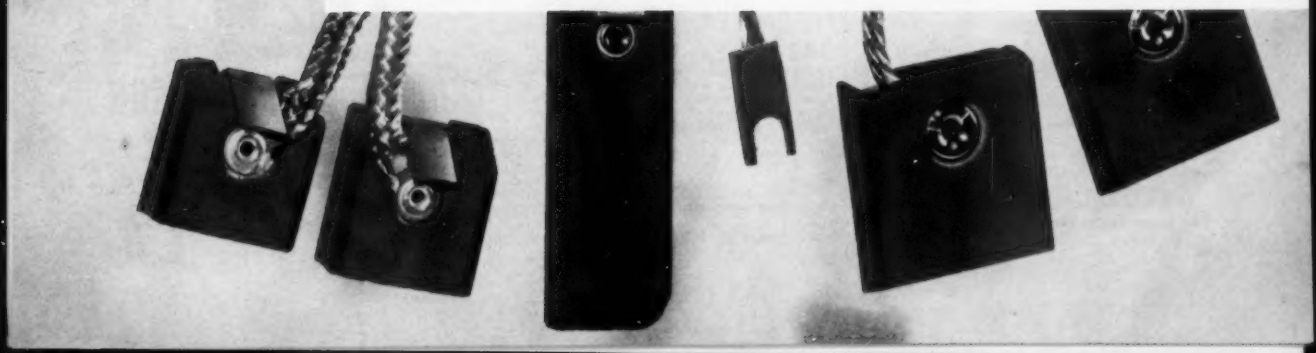

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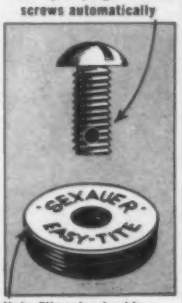

Note Fiberglas backing — resists closing squeeze

Now, NEW Pat'd. "Sexauer" SELF-LOCK screws, with expanding NYLON PLUG imbedded in the threads, fasten and *lock* at correct depths AUTOMATICALLY, hold faucet washer *firmly*. Made of rust and corrosion resisting Monel, heads won't twist off, screw slots won't distort; they can be used over and over.

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EASY-TITES are made of super-tough, pliable duPont compound (neither rubber nor fibre) to withstand super-hot water and make tight even on worn, corroded seats. They are further *reinforced* with a vulcanized layer of Fiberglas to resist distortion and splitting from shut-off squeeze.

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As authenticated by Hackensack, N. J. Water Co. and American Gas Association, stopping just ONE pin-hole (1/32") size leak can *reduce* water waste 8,000 gal. monthly. Stopping a *hot water* faucet "drip" can result in water and fuel saving of over $7.58 QUARTERLY—plus material and labor costs and *costly* fixture replacements!

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DATA FILE

(Begins on page 192)

dustrial liquids are provided in 20-pp Form 566. Explains value of metering in batch mixing, process and cost control. Illustrated charts show how to select proper meter according to type, temperature and flow rate of liquid to be metered, and include specifications for models shown. Strainers, valves and other accessories are described. Neptune Meter Co.

334 Thermal Controls — Descriptive and basic technical data on company's Thermoswitch controls are presented in 16-pp condensed Catalog 500. Products listed include the following types of controls: standard line, differential expansion; liquid filled snap-action, midget ad miniature differential expansion; indicating controllers, bulb and capillary, and electronic. Fenwal, Inc.

335 Temperature Controls — Eight-pp Catalog CC, on temperature controls and allied equipment for heating and refrigeration, provides information on recording, indicating, non-indicating controls; thermometers; bulb installation accessories; process timers, and gas pilots. Includes prices and references to detailed literature. The Partlow Corp.

336 Combustion Controls—Included in this catalog (about 16 pp) are product descriptions of company's combustion instruments and controls. Covers damper controls; drive units; draft, air pressure and flue temperature gages; steam controls; panel board cabinets; low-draft cut-off switches. Pages are fully illustrated to show design and operational details, and brief text includes application suggestions, special features. An oil burning manual of information is included with this catalog. Cleveland Fuel Equipment Co.

337 Contour Projectors—The use of projection or optical gaging with company's contour projectors is discussed in this illustrated bulletin. Points out chief advantages and describes typical applications. Specifications and dimensional diagrams for a number of models are included. Eastman Kodak Co.

338 Television Equipment — Twenty basic applications for "TV Eye" low-cost closed circuit television equipment are described and pictured in Form 3R2335. Folder explains equipment's functions and operation, lists specifications. Radio Corp. of America.

VALVES, TRAPS, PIPING AND ACCESSORIES

339 Choosing the Right Valve — Presenting valve selection as a matter of matching the valve's service characteristics with the service requirements of the job, this practical 20-pp booklet explains and illustrates basic design features of gate, globe and check valves. It tells in non-technical language, how each of these valve types works, and where it is best suited for use. Disc, stem connection, bonnet and bonnet-joint characteristics are also discussed and stem-operation is treated. Crane Co.

340 Bronze Valves—Globe and angle bronze valves with rising stems, union bonnets and stainless steel plug type seats and discs are described in this bulletin. Discusses design advantages, gives dimensions. The Walworth Co.

341 Automatic Controls—Technical data on company's line of automatic controls are presented in this 46-pp catalog. Includes specifications, dimensional tables, electrical ratings and capacity data on diaphragm gas valves, magnetic valves, hydramotor valves, oil burner valves, reducing valves, safety shut-off electromagnetic valves, time delay valves, and others. Photos, drawings and dimensional diagrams illustrate text. General Controls.

342 Hydraulic Control Valves—Eight new hydraulic control valves with ball detent for position locking are described in 26-pp Section 4 of this company's Catalog 200. Included are six three-position, four-way valves, and two two-position, four- and three-way valves. Dimensional data and typical circuit diagrams are provided. Logansport Machine Co., Inc.

343 Diaphragm Valves—Catalog V-55, 34-pp, covers operation, installation and selection

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TO SERVE YOU BETTER: Herc-Alloy chain assemblies can now be ordered with either of two types of coupling links.

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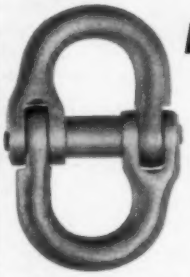

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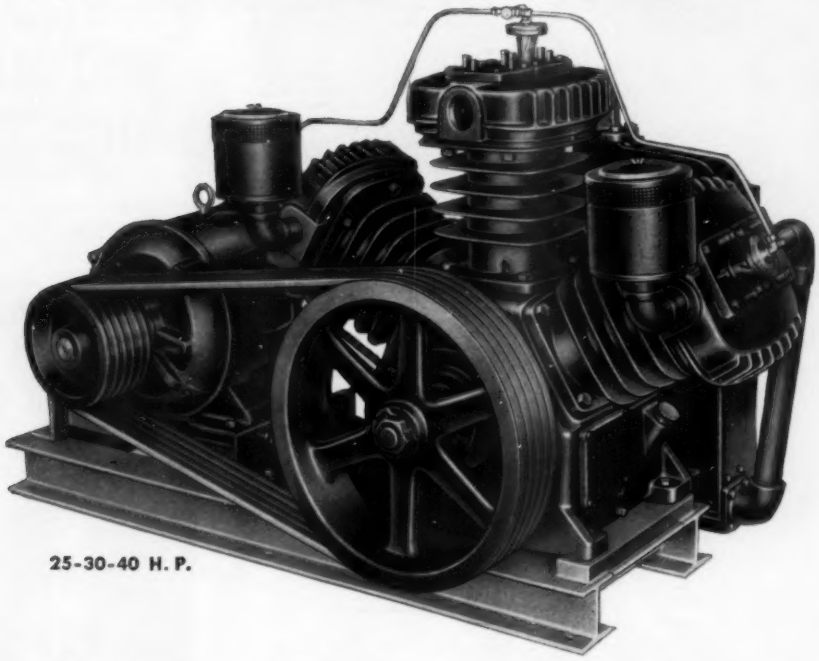
THE NEW CURTIS MODEL C-100
TWO-STAGE, AIR-COOLED AIR COMPRESSOR

Provides Higher Operating Efficiency Costs Less to Install



25-30-40 H. P.

THIS NEW Curtis Two-Stage will deliver more air per minute, per horsepower and per kilowatt hour of electrical energy consumed, thus assuring a saving in your electrical bill.

It's Air Cooled, thereby eliminating expensive water bills and assuring quick and easy installation with no complicated plumbing problems.

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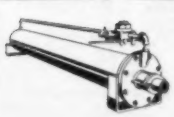

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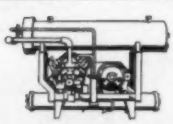
AIR CYLINDERS



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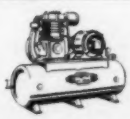

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DATA FILE

(Begins on page 192)

of diaphragm valves for handling of acids, alkalis, gases, volatile and viscous substances, water and other fluids, compressed air, vacuum, slurries, semi-solids, beverages and food products. Diaphragm materials are described, selection tables included, as well as dimensional drawings. Hills-McCanna Co.

344 **Corrosion Resistant Valves**—Monel and nickel corrosion-resistant valves are described in Bulletin 9. Discusses corrosion-resistant properties of Monel and nickel, listing specific applications for which each is suited. Gives casting composition of both alloys and describes their mechanical properties. Cross-sectional illustrations of gate, globe and check-type valves are included. Alloy Steel Products Co.

345 **Steam, Air and Gasoline Traps**—Catalog 751, 32 pp, is a trap ordering book with capacity tables, installation diagrams, and containing charts and formulas for determining proper size trap for specific applications. Covers thermostatic steam traps, expansion steam traps, weight-operated traps for steam, air, gasoline, pressure up to 1500 lb. W. H. Nicholson & Co.

346 **Steam Trap Selector**—Twelve-pp Bulletin T-9 is designed specifically to aid in the selection and application of steam traps on chemical processing equipment. Features a fold-out piping diagram for 22 pieces of typical processing equipment—each showing recommended steam trap and piping arrangements. Also contains steam trap selector tables. Yarnall-Waring Co.

347 **Steam Trap Solutions**—Bulletin F-151, titled "Solving Steam Trap Problems," is a 36-pp illustrated booklet giving specifications and capacities of steam and float traps, air release valves, pipe line strainers. Tells how to calculate condensation loads and select traps for unit heaters, jacketed kettles, submerged surfaces. Gives pointers on installing and servicing traps. Also included in this edition is information on combination flat and thermostatic traps. The V. D. Anderson Co.

The two Reader Service Cards on pages 187-188 are easy to use and need no postage. Just circle the item number of catalogs wanted.

348 **Jacketed Piping, Cocks**—Twelve-pp Bulletin 152 discusses the special advantages, problems and requirements of jacketed piping installations and shows how manufacturer's jacketed piping, cocks, fittings and relief valves are designed to fulfill requirements. Illustrated with photos and drawings, includes specifications. Parks-Cramer Co.

349 **Aluminum Pipe and Fititngs** — Aluminum pipe—for conveying everything from air to acid—is described in this 18-pp Form AD197. Booklet presents characteristics and advantages for each major field of application. Specifications are provided, along with a description of appropriate fittings and methods of installation. Describes process industry applications and advantages. Similar treatment is accorded other fields, including pipelines, portable piping, and structural piping. Aluminum Co. of America.

350 **PVC Pipe Fittings, Flanges**—This is a comprehensive 12-pp catalog on corrosion resistant pipe fittings and flanges in normal- and high-impact grades, rigid, unplasticized polyvinyl chloride. Shows characteristics, advantages and limitations. Lists operating pressures, temperatures, applications, price comparisons, fabrication advice, installation and supporting recommendations, dimensions and weights. Grinnell Co., Inc.

351 **Glass Pipe and Fittings**—Corrosion-resistant qualities of thia Pyrex brand glass pipe and fittings which make it suitable for use under corrosive conditions are described in 18-pp Bulletin EA 3. Operating temperatures, physical characteristics, installation procedures

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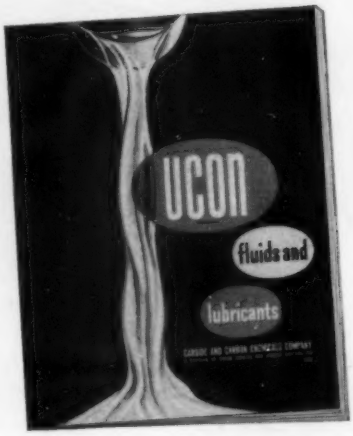

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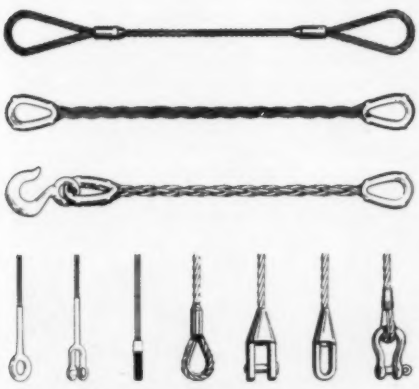

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DATA FILE

(Begins on page 192)

are covered and specifications and dimensional drawings are included. Corning Glass Works.

352 **Improved Hose Coupling**—A quick connect-disconnect hose coupling for water, oil, steam, gas and chemical lines is described in this 16-pp bulletin. Describes the coupling's construction and explains how it provides a sealing action which makes the coupling tighter as internal pressure increases, and a full swiveling action that prevents hose twisting and kinking. Titeflex, Inc.

353 **Welding Fittings**—When and where to use company's Weldolet welding fittings is told in 38-pp Bulletin W-4. Includes tables listing sizes, dimensions, weight, and price, as well as dimensional drawings. Installation procedure is fully described and specifications, graphs providing reinforcing information, and photos of typical applications are also included. Bonney Forge & Tool Works.

354 **Valve Couplings**—Bulletin 551 presents engineering data on company's line of valve couplings, hose couplings and hose clamps. Includes dimensions for valve couplings, price list, and a table showing dimensions of standard hose couplings. C. B. Hunt & Son, Inc.

INSULATION

355 **Industrial Insulation**—This 8-pp bulletin describes Alltemp, an all-temperature pipe and block insulation from 100 to 1600 F. Physical characteristics, recommended thickness data, method of application are included, with 10 advantages of this insulation. Other industrial insulations also described from 2500 F to sub-zero. Information on Engineering Service offered by company also listed. The Philip Carey Mfg. Co.

356 **Piping Insulation** — Seven-pp Bulletin SO 1054 features a snap-on, one pice molded pipe insulation of fine glass fibers for hot or cold piping. Specifications are given for industrial, commercial, and institutional piping where maximum efficiency is of primary importance and for hot water and low pressure steam. Gustin-Bacon Mfg. Co.

LUBRICANTS, LUBRICATION

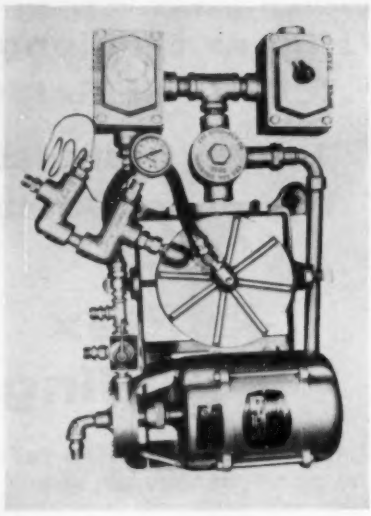
357 **Proper Lubrication** — Presenting proper lubrication as the life blood of all machinery, 36-pp Lubriplate Data Book 54-1 is a helpful treatise on modern lubrication practice. Gives product data on both oil type lubricants and greases and discusses choice of lubricants for use in applications involving heavy loads, high speeds, extreme temperatures, water conditions and other conditions. Provides tables of specific recommendations for various classes of equipment used in chemical processing, metal-working, other industries. Lubriplate Div., Fiske Brothers Refining Co.

358 **Centralized Lubrication** — Pocket-sized 24-pp, Form 34-22, called "Ask Anyone in Industry" describes in comic-book form the hazards and inefficiency inherent in conventional lubrication practice and promotes use of centralized lubrication—in the form of Alemite Accumeter measuring fittings. Shows how these are connected by tubing to a lubrication pump which is controlled by a timer. Alemite Div., Stewart-Warner Corp.

359 **Lubricants—Specification, Classification** —Vital information on selection of lubricants is presented in 10-pp Vol. 41, No. 4 of Lubrication. Covers such items as performance specifications, initial suitability of lubricants, quality of lubricant, effect of lubricant on production, effect on maintenance, effect on power, effect on cost, and features a look to the future. The Texas Co.

MAINTENANCE

360 **Basic-Roofing Information**—"What You Should Know About Your Roof" is a 40-pp clearly illustrated booklet which tells what makes a roof fail, how to recognize signs of roof deterioration, what to do to keep a roof in good condition. Discusses recommended roofing practices, essentials of a good re-roofing



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For full information on the Viscomatic temperature controller and a free booklet entitled "Why Hot Spray?", write: The Spee-Flo Company, Dept. PE-15, 720 Polk, Houston, Texas.

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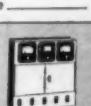

CONTROL PANELS

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Radio Corporation of America
Harrison, N. J.

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DATA FILE

(Begins on page 192)

joh, also special features of company's roofing materials. Johns-Manville.

361 **Building Maintenance** — Handbook 7 offers 64 pp of information on floor surfacing, leak stoppers, external wall sealants, roadpatching, roofing materials. Includes instruction for applying them. Flexrock Co.

362 **Hot-Dip Galvanizing**—How hot-dip galvanizing is prolonging life of industrial equipment is stressed in this 16-pp booklet. Photos, showing galvanized equipment in use accompany brief text explaining how this process of covering iron and steel with a protective coating of zinc serves to prevent rust. The galvanizing procedure is explained and illustrated. Coating comparison charts show how hot-dip galvanizing compares with other types of coatings as to rust resistance, dimension limits, shock resistance. American Hot-Dip Galvanizers Assn., Inc.

363 **On Rust Prevention**—This 1956 General Catalog, 28-pp Form 255, presents a treatise on rust prevention with illustrations of Rust-Oleum uses and applications throughout industry. Included are 102 color chips showing variety of colors available in primers, short oil type coatings, oil field finishes, restful color group finishes, machinery and implement colors, long oil type coatings, calvinoleum coatings, heat resistant coatings, chemical resistant coatings. Rust-Oleum Corp.

364 **Protective Paint**—Thirty-five case histories of successful use of protective coatings based on chlorinated rubber are included in this 20-pp bulletin, "Protection With Parlon". Photos show water and sewage works, paper mills, storage tanks, and chemical and food processing plants where these coatings have had long-term exposure to corrosive environments. Includes performance data, instructions for application. Hercules Powder Co.

365 **Insulation Coating** — This 32-pp illustrated handbook, Form L-17, presents the advantages of company's NoDrip insulation coating for preventing condensation drip from metal, concrete, brick, wood, plaster or composition surfaces. Lists applications and describes methods of applying. Contains tabulated data on quantity required to cover various size tanks and pipe. J. W. Mortell Co.

366 **For Fast Floor Repairing** — This illustrated bulletin covers Kwik-Roc, a fast and tough hardening material for repairing holes and cracks in concrete floors. Tells how to prepare surfaces for Kwik-Roc, how to mix, place, and store it. Includes service recommendations. A. C. Horn Co., Inc.

367 **Better Floor Care** — This illustrated folder describes products designed to aid efficient floor care. Lists combination Scrubber-Vac machines, conventional scrubbing-polishing machines, steel-wool pads, applicators, vacuum cleaners, mop trucks and other mopping equipment. Included are waxes, sealers and cleansers. Finnell Systems, Inc.

368 **Cleaning Problem Solutions**—Illustrated Bulletin 154, 12 pp, presents information on a wide range of cleaning methods and shows equipment available. Special emphasis is placed on the stationary vacuum cleaning system and its long-run economy in many installations. The Spencer Turbine Co.

369 **Light Scaffolds** — This series of illustrated bulletins describes company's line of aluminum alloy Up-right scaffolds and accessories. Pictures one-piece sections and multi-section models with various ranges of adjustability. Points out such features as locking hooks which provide automatic security and locking casters for safety on stairways and inclines. Up-Right Scaffolds Div., Up-Right, Inc.

CONSTRUCTION

370 **How to Glaze with Plexiglas**—Sixteen-pp Booklet PL-23 gives detailed information on glazing industrial and other buildings with flat panels of the acrylic plastic Plexiglas. Written for plant engineers concerned with frequent breakage of windows or other glazing problems. Gives properties and behavior of this sheet. Plastic Dept., Rohm & Haas Co.

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Using

DU PONT ELASTOMERS

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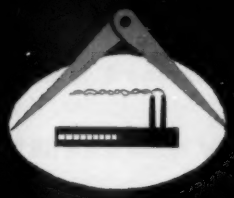


in Industry

Brine, animal fats no threat to durable NEOPRENE truck tires

Hand-truck tires are subjected to such severe exposure conditions in a meat-packing plant that conventional rubber tires have to be replaced in a matter of months. They are constantly rolling over brine, animal fats and blood . . . in fact, the floors are so greasy in places that salt is sprinkled on them to prevent slipping.

The C. D. Moyer Co. of Silverdale, Pa., has solved its tire replacement problems with the help of neoprene. Here is the report of the company's plant superintendent. "Rubber tires used to swell up and jam the wheel within a few months. We've had no trouble at all since switching to neoprene *8 years ago*." Neoprene tires are now standard at Moyer's, not only in the lard and meat-processing area, but even on the package hand truck in their warehouse.

Neoprene offers you cost savings wherever operating conditions demand extra resistance to oil, grease, chemicals, heat and outdoor exposure. Mail the coupon for further information about neoprene.

NEOPRENE TIRES have been in service 8 years in this meat-packing plant. Rubber tires previously used lasted only a few months.

For more facts circle 641 on Reply Card

HYPALON doubles service life of belt exposed to 300°F.

Previous belt life was maximum of 3 months

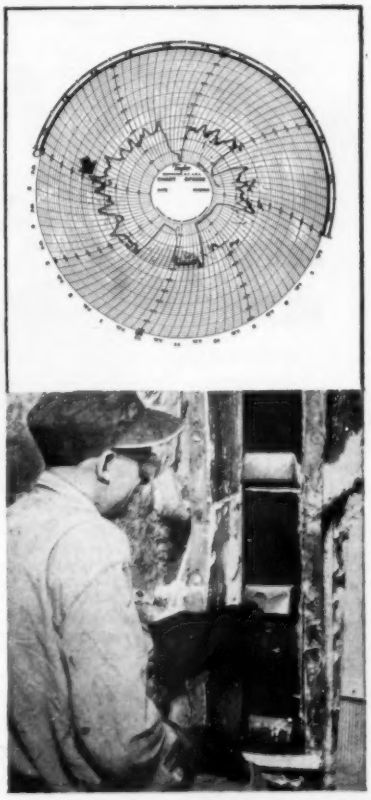
Engineers at a large chemical plant were confronted with the problem of finding an elevator belt that would resist extremely high temperatures. The belt had to lift hot salt from a rotary drying kiln to a loading platform. Average temperature of the salt was 300°F. so that even the best rubber belts were lasting only three months. Heat caused embrittlement and cracking of the rubber where the monel buckets were attached to the belt. Soon the belt ruptured.

The answer to the problem was a specially designed hot-materials belt covered with HYPALON, Du Pont's new synthetic rubber. The HYPALON-covered belt lasted six months—twice as long as previous belts—despite the fact that the belt is fully enclosed and in operation about 80 hours a week.

This is just one example of the *extreme service conditions* for which HYPALON is especially suited. It demonstrates that HYPALON, compared to other kinds of rubber, shows unusual resistance to hardening at elevated temperatures (250°F. to 350°F.).

OTHER ADVANTAGES

HYPALON also is completely resistant to ozone and has excellent resistance to strong oxidizing agents. In addition, it resists abrasion, weathering and flex cracking. For these reasons, HYPALON can help reduce plant maintenance costs.



HYPALON-covered elevator belt resisted salt temperatures averaging 300°F. for six months. Chart above shows a peak temperature of 518° F. (arrow).

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the new "low-level" design

Built-in quality and dependability. Free-action butterfly dampers open and close automatically; assure dependable all-weather protection. Sizes 12″ to 48″. Capacities to 41,000 CFM.

roof ventilators — write for bulletin 600

model 51

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Forces out stale, stagnant air or pulls in fresh, clean air. Serves as gravity ventilator when fan is not in operation. Conforms to modern plant design. Sizes 24″ to 48″. Capacities to 26,450 CFM.

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Heavy-duty galvanized steel, with automatic dampers, for greater resistance to weather and corrosive atmospheres. Bolted construction increases strength; simplifies servicing. Sizes 12″ to 72″ for capacities to 80,000 CFM.

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DATA FILE

(Begins on page 192)

371 **Panel Wall Construction** — The advantages of company's M-Type Q-Panel walls are outlined in 12-pp Bulletin Q-35-55. Includes installation photos, diagrams, specifications, as well as drawings pointing out structural details. H. H. Robertson Co.

372 **Fiberglass Reinforced Panels**—This file of bulletins covers fiberglass-reinforced panels for a wider range of industrial glazing jobs. Data is provided on shatterproof panes, Fire-Snuf panels, and metal-reinforced security panels. Strength test reports and physical data as well as information on light transmission qualities are included. Resolite Corp.

373 **Glass for Industrial Use**—How glass is used and how to choose the proper type for the application are covered in 12-pp Catalog 56-1. Discusses glass according to function; light diffusion and glare reduction; decoration; protection; and heat absorption. Photos showing various finishes and typical installations are provided, along with performance data, selection and installation tips, light transmission ratings and other data. General advantages offered by company's line of glass are also detailed. Mississippi Glass Co.

374 **Glass Blocks**—This 24-pp catalog describes company's glass block and its functions, and lists various glass block patterns manufactured, including light and solar heat controlling blocks, with details on functional advantages of each specific pattern. Included are instructions and construction details for both large and small-size panel installations in steel, wood frame, brick or brick veneer construction. Table of dimensions; a section on how to calculate illumination and brightness; and tables on solar heat control and fuel savings included. Kimble Glass Co.

375 **Window Modernization**—How to modernize old windows with company's glass blocks is told in 8-pp Bulletin GB-104. Selection data is included, along with photos of typical installations. Pittsburgh Corning Corp.

376 **Data on Panel Material**—This 12-pp booklet is a new edition of a guide to the use of Presdwood. Generously illustrated with drawings and photos, it describes basic and special Presdwood products and their properties, tabulates available sizes, describes working and finishing methods, and illustrates various finishes. Masonite Corp.

377 **For Stairway Construction**—This 12-pp illustrated booklet describes the use of this company's Junior channels in stairway construction. Provides specifications and shows some of the buildings in which the channels have been used as stair stringers. Tables give size and weights, and show allowable loads. Jones & Laughlin Steel Corp.

378 **Safety Gratings**—Increased efficiency and safety are described as chief advantages of company's safety gratings featured in 16-pp Catalog BC-3. Describes various types of gratings, includes size and price data, and is illustrated with photos and drawings showing construction and typical applications. Bustin Steel Products Inc.

379 **Non-Slip Flooring**—Algrip, an abrasive rolled steel floor plate described as non-slip even on steep inclines, is the subject of Booklet AL-29, 8 pp. Discusses safety features; gives fabricating data. Alan Wood Steel Co.

380 **Steel Grating and Treads**—Bulletin 2486, 16-pp, describes types, sizes and load characteristics of company's line of electroforged steel and interlocked aluminum grating and treads. Points out advantages in design and construction resulting in greater safety, pictures applications, and includes specifications, photos and diagrams. Blaw-Knox Co.

381 **Metal Grating Handbook** — Sixteen-pp Form 500 is data and specification manual covering all types of grating, open steel floor armor, stair treads, vessel liners, decking and drain grates. Contains safe load tables for basic types of gratings, panel width constant charts, tables on standard widths and types of steel treads, types of anchors used for grating. Klemp Metal Grating Corp.

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- Less expensive than special strap anchors.
- Handier; no more waiting to have anchors made.
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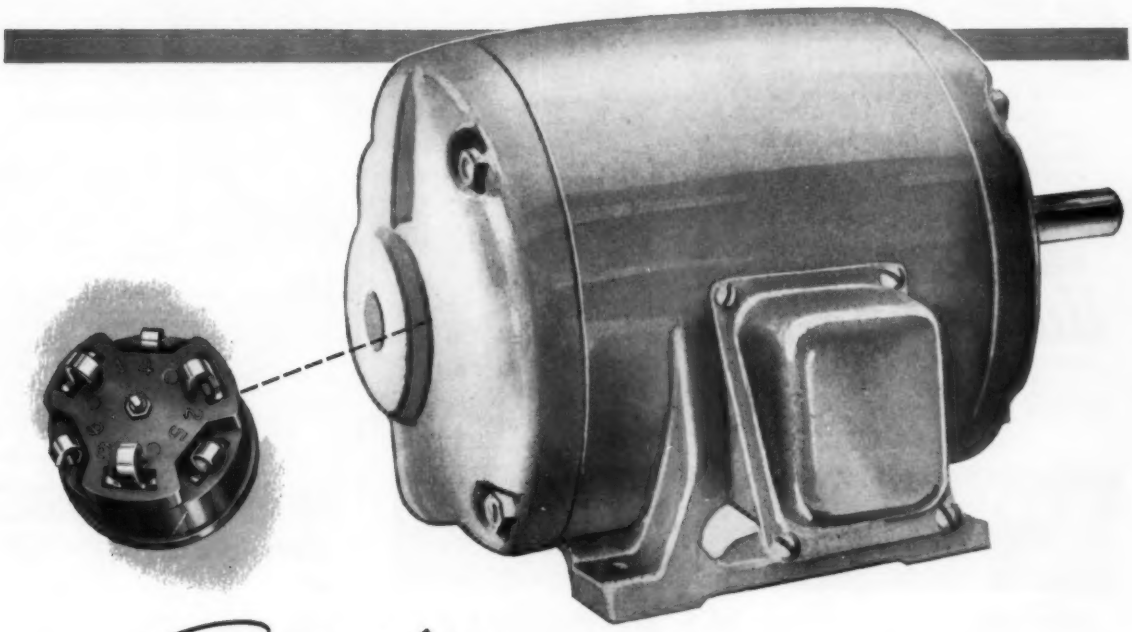
Inherent Motor Burnout Protection

That Allows Full Motor Capacity With Maximum Safety



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In the past, where 3-phase motors have had to rely on remote overload devices, many motor burnouts could be traced to the wrong size heater having been installed to avoid nuisance trips. The machine designer, simply by specifying motors with KLIXON Inherent Protectors, can now be assured that his motors will not burn out, yet will deliver maximum motor capacity.

KLIXON Inherent Motor Protectors provide positive protection against overheating from all running and stalled rotor conditions:

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- **Stalling**
- **Failure to start**
- **Lack of ventilation**
- **Increase in ambient temperatures**
- **Plugging or reversing duty**

KLIXON 3-Phase Motor Protectors are available in four sizes — covering a range of horsepower ratings from fractional up through 7½ hp. (600V.), single or dual voltage. Write for Bulletin MOPR-1 which explains inherent motor protection.

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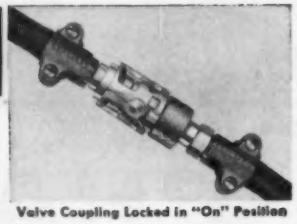
Quick-As-Wink®

safety type, locking, quickly detachable

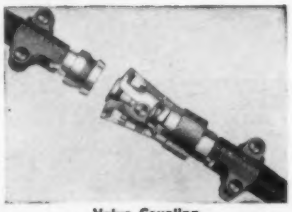


Valve Coupling Locked in "On" Position

VALVE COUPLINGS

give operator complete control of the air line at any point

Operator can shut off air and change tools quickly. Newly improved design permits the coupling to be locked in either "On" or "Off and Exhaust" position. Air in tool is exhausted to atmosphere automatically, preventing accidents. Pressure tight leak-proof construction — but free swiveling to avoid kinking the hose. For any application involving line air to 250 psi.



Valve Coupling Unlocked and Disconnected

Valve Coupling Locked in "Off and Exhaust" Position

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Air and Hydraulic Control Valves and Pressure Specialities

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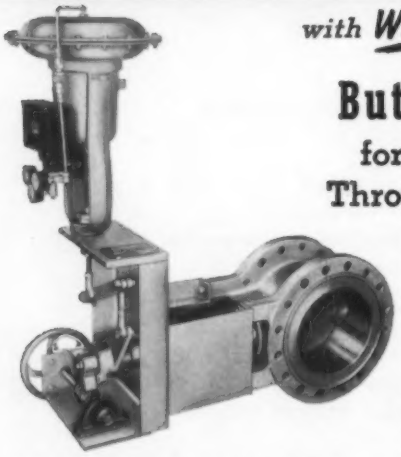
Meet Any Flow Conditions

of Pressure · Temperature · Corrosion

with **W. S. ROCKWELL**

Butterfly Valves

for Tight Shutoff— Throttling—Regulating



12" stainless steel valve for hot gas at 265 p.s.i.; has automatic air operator, auxiliary hand wheel and valve disc positioner.

Minimum pressure drop • Self-cleaning • Compact • Lighter weight • Less space • Easy to install.

Made in all sizes from 4" to 144"; pressures to 300 p.s.i. and higher, in any metal or rubber covering; with any manual or automatic operators. There's a wide choice for your applications on air, gases, liquids or solids. Write for Catalog.

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DATA FILE

(Begins on page 192)

382 Corrosion-Proof Materials—Bulletin CC-3, 16-pp, gives basic information on company's corrosion proof construction materials, covering chemical and physical data, estimating data and descriptions of products used for acid proof installations in the metal working, chemical, petroleum, pulp and paper and other industries. Included are sections on corrosion proof cements, tank linings, protective coatings, rigid plastic fabrications and rigid plastic pipe, plus a chart showing their resistance to chemicals. The Atlas Mineral Products Co.

383 Air Tools, Paving Breakers—These two bulletins describe company's latest models of paving breakers and air tools for plant construction and maintenance work. Bulletin PB1 gives features and specifications on heavy-duty, medium-weight and lightweight paving breakers, as well as tools for use with them. Bulletin ST-100 describes and gives specifications for clay spaders, trench diggers and backfill tampers. Gardner-Denver Co.

STORAGE EQUIPMENT

384 Storage Equipment—Catalog 100-E, 72-pp, illustrates and describes company's complete line of steel cabinets, folding chairs, chests and safes, stools, tool boxes, work benches, tool stands, shelving, tool storage, lockers, coat racks, filing cabinets, revolving bins, others. Includes dimensions and other specifications. Photos illustrate some typical equipment installations. Lyon Metal Products, Inc.

385 Steel Shelves—Catalog S-300, 20-pp, features a line of adjustable, interchangeable steel shelves, describing typical installations, flexibility in shelving arrangement and other advantages. Various types of units are shown and specifications are given. Penco Metal Products Div., Alan Wood Steel Co.

386 Adjustable Shelving—How this shelving can save assembly time is explained in 28-pp

ARMSTRONG BROS.

Better PIPE TOOLS

PIPE CUTTERS

"ARMSTRONG BROS." Three wheel and Standard wheel and roller Pipe Cutters are quality cutters throughout . . . built to give years of good service.

"ARMSTRONG BROS." drop forged Pipe Cutters are built for lifetime service with 1-piece drop forged steel heat treated body and a replaceable hardened steel nut to take up the wear and thrust to handle screw. Used either as 1-wheel (with 2-rollers) or 3-wheel (for close quarters).

"ARMSTRONG BROS." Knife Blade Cutter Wheels are machined from special alloy tool steel properly heat treated. They cut rapidly and easily, hold their keen edge.

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ARMSTRONG BROS. TOOL CO.

"The Tool Holder People"

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DATA FILE

(Begins on page 192)

Form 2111. Photos and drawings of various types of shelving units, including open and closed shelving, bin units, ledge shelving, counter shelving, cabinets with swinging and sliding doors, parts and accessories, are included, along with specifications. Standard Pressed Steel Co.

TOOLS, WELDING, AND MACHINE SHOP EQUIPMENT

387 **Portable Electric Tools**—This standard catalog, Form 10, 24 pp, features portable electric tools, including electric drills, bench-drill stands, hole saws, buffing and polishing kits, sanders, polishers, grinders, hammers, saw blades, vacuum cleaners, and others. Photos included. The Black & Decker Mfg. Co.

388 **Data for the Shop**—"Fluids and Facts for Metal Working" is a pocket-size booklet of about 44 pp. A section on metal working fluids covers their function and selection, preparation and use of soluble oils and paste compounds, and prevention of dermatitis. A section on metal working facts gives conversion tables, steel numbering systems, machinability ratings of metals, drill grinding charts, twist drill sizes and other data. Standard Oil Co. (Ind.)

389 **Pipe Tool Ordering Guide**—Catalog 2-51, 8 pp, covers company's line of threaders, cutters, vises, dies, tongs and wrenches; gives prices. Armstrong Bros. Tool Co.

390 **On Spot Welding**—"Spot Welding from One Side—With a Portable Gun," 12-pp, describes an inert-gas-shielded tungsten-arc spot welding process. Over 30 tables, weld cross-section and application photos, drawings and graphs are included. Sections of text cover when to consider spot welding from one side, how the equipment operates, standards and test procedures, factors affecting weld. Air Reduction Sales Co., Div., Air Reduction Co., Inc.

391 **Where to Use Your Stud Driver**—Twenty-pp pocket-size Form 955 describes and pictures applications of studs, using company's Model 450 stud driver. Provides some operating hints and safety precautions and covers use of studs through steel into concrete, wood into concrete, wood into steel and steel into steel, as well as their use for attachment of pre-drilled fixtures. Remington Arms Co., Inc.

MATERIALS HANDLING

393 **Cranes for Big Jobs**—A new 1½-yard shovel, 35-ton crane is described in this 6-pp catalog. Action pictures of the machine in quarries and gravel plants are included, also specifications. American Hoist & Derrick Co.

394 **Electric Hoists**—Twelve-pp Bulletin DH 133B describes Speedway electric hoists of 500- to 4000-lb. capacities. Fully illustrates and explains design features and gives details on suspensions and conductor systems. Clearance data, specifications included. Wright Hoist Div., American Chain & Cable Co., Inc.

395 **Electric Hoist Manual**—Catalog 215-B offers 38 pp of engineering, application and ordering information on company's Load-Lifter electric hoists. Presents hoists with hand operated trolleys and with power travel, hoists with lug suspension, hook suspension and push-type trolleys, and with hand-geared trolleys. Manning, Maxwell & Moore, Inc.

396 **Manual on Electric Hoists**—Catalog H-46, 40 pp, covers monorail and stationary hoists and car pulleys. Explains fundamental types of grabs, methods of hanging I-beams, types of hoist suspension, controls. American Engineering Co.

397 **How to Choose a Crane**—Designed to aid in the selection of overhead cranes, 8-pp Unit 79 shows how to analyze handling problems, decide on the type of crane desired and draw up specifications for crane proposals. Basic data is provided on classes of crane service, crane ratings and capacities and recommended speeds for bridge, trolley and hoist, along with standard dimensions and clearances. Gives 14 safety features. Whiting Corp.

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It's a fact that the efficient I-R construction often enables you to use a smaller Motorpump to do the work usually demanded of pumps of greater horsepower!

So, I-R Motorpumps reduce your costs in several ways. First of all, in original cost. Save weight and space, too. Deliver more gallons-per-minute per horsepower used . . . and cut maintenance costs as well, because Motorpumps are built for longer, trouble-free service!

If you're not familiar with the famous I-R Motorpump line you'll do well to get full details right away.

The latest catalog gives complete data needed to choose a Motorpump . . . from ¼ to 75 hp, capacities 5 to 2800 gpm, heads to 650 ft. Write to:

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NAGLE PUMPS won out on this "pump-killing" job!

Since 1946 Nagle 4" type "T", frame 119 L horizontal shaft, centrifugal pumps have yielded high performance handling a highly abrasive and heavy mixture of asbestos and portland cement, at a plant of Flintkote Co.—just the kind of gruelling application for which NAGLE PUMPS are designed. Water-end parts are abrasion resistant, highly effective stuffing box is readily accessible and slippage seal easily adjusted. Split bearing stand can be quickly dismantled, but that's seldom necessary.

NAGLE PUMPS are establishing fine performance records in abusive applications where ordinary pumps fail, such as in chemical and petrochemical plants, atomic energy plants, mines, mills and quarries. **Send for Catalog 5206.**

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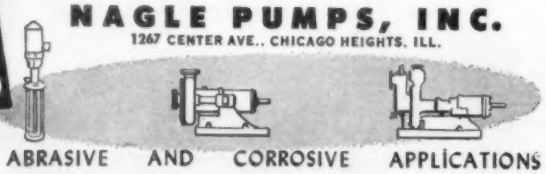

PUMPS FOR ABRASIVE AND CORROSIVE APPLICATIONS

For more facts circle 650 on Reply Card

DATA FILE

(Begins on page 192)

398 Crane and Hoist Parts—Bulletin G8 covers company's line of hoist grabs as well as component parts for various type cranes. Includes photos and drawings of the parts, along with descriptions and specifications. Downs Crane & Hoist Co.

399 Overhead Handling System—Engineering and application data on overhead handling equipment is presented in 12-pp Bulletin 2008-L. Describes stresses developed in various type tracks used for overhead handling systems. Problem of track peening and its solution is also covered. Data is given on principal components of systems. Cleveland Tramrail Div., The Cleveland Crane & Engineering Co.

400 Overhead Cranes—Bulletin T202, 20 pp, gives full information on top running double girder cranes with top running trolley in capacities from 2 to 12 tons, spans to 60 ft. Data is also given on top running single girder cranes, both motor driven bridge types and head geared or push type in capacities from 1 to 10 tons, spans to 50 ft. Features which contribute to efficient operation and low maintenance costs are detailed. Several pages are devoted to electrical information. Chicago Tramrail Corp.

401 Continuous Power Conveyor — Sixteen-pp Catalog A-96 describes a packaged overhead conveyor for light duty applications. This complete basic "package" contains drive unit, take-up, oiler and other items essential for a 50-ft system. Describes power drive unit, track, power chain and other components and discusses lubrication and chain safeguards. Suggested layouts are diagrammed, and some installations of these conveyors are illustrated. Richards-Wilcox Mfg. Co.

402 Power and Free Conveyors — Catalog 52, 80 pp, describes important features of a power and free conveyor system and illustrates component parts. Includes data on trolleys, rivetless chain, single and compound vertical curves, switches, caterpillar drives, roller curve takeups, inspection and lubrication gates, carriers, load bars, bumpers, automatic stops and feeders, others. Dimensions and standard assemblies are shown on diagrams and typical applications pointed out. Jervis B. Webb Co.

403 Engineered Conveyor Systems—Catalog 853, 32 pp, illustrates conveyor systems in use in a wide range of industries, showing how they suit handling requirements involved. Roller, wheel, belt, chain, overhead trolley and elevat-

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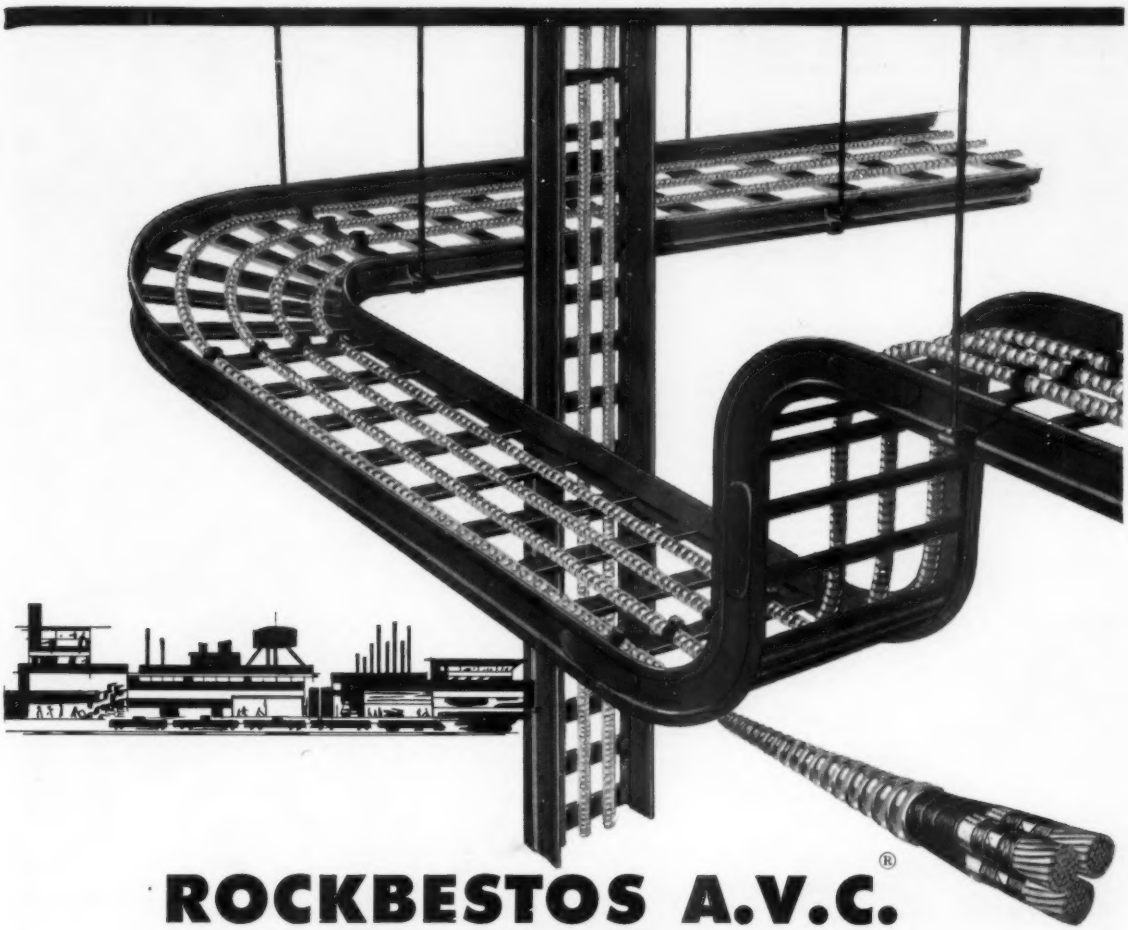

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DATA FILE

(Begins on page 192)

ing conveyors are included, also spirals, portable power conveyors, ball transfers and special equipment. Mathews Conveyer Co.

405 **Metal Conveyor Belts** — This 24-pp booklet is an illustrated guide to selection of metal conveyor belts. Presents both conventional and balanced spiral weave belts; covers raised edge and flight constructions, chain edge construction, high temperature belts, wire conveyor aprons. Wickwire Spencer Steel Div., The Colorado Fuel & Iron Corp.

406 **Fork Truck Efficiency Test**—This 8-pp article explains how to tell when fork trucks need corrective measures. Lists equipment and facilities necessary for truck testing, tells how to test traveling efficiency and hoist speed measurements, shows suggested test data forms. Mercury Mfg. Co.

407 **Materials Handling Methods** — Bulletin 552, 16-pp, illustrates 48 manhour and space-saving handling operations, and shows various material handling equipment at work in many industries. Shows how properly selected equipment gets more work done and reduces costs by making handling jobs easier. Describes general materials handling movements, motor truck loading and unloading, storing goods and materials ceiling high, handling skids and pallets with same truck. Barrett-Cravens Co.

408 **Lift Truck Work Kit**—A method of predetermining the time necessary for fork lift trucks to perform specific operations is provided in this work kit, designed to enable plant engineers to apply fork lift truck standard performance data. It can assist in determining efficiency of fork lift trucks now in use as well as in planning for future needs. Includes typical materials handling examples to show technique for application of the data, as well as charts providing times for basic truck motion elements. The Yale & Towne Mfg. Co.

409 **Sheet Lifter**—Operational and design features of company's sheet lifting equipment, which contribute toward efficient handling, flexibility and economy are explained in Bulletin S-25, 16 pp. Cullen-Friestedt Co.

410 **Oil-Hydraulic Lifts** — Catalog RE-203, 20-pp, covers the field of heavy-duty oil-hydraulic lifting devices for industrial applications. Featured in catalog are company's standard Levelator lifts, a 6000 lb single-jack model and a 12,000 lb dual-jack lift. Also featured is an electric pump mounted on an oil tank for powering oil-hydraulic devices. Illustrates lift platforms, platform accessories and safety devices, jacks, power units. Rotary Lift Co.

411 **Handling Baskets**—Bulletin B-54 describes company's complete line of standard and custom-engineered Eezy-Stak parts handling baskets, for machinery, washing, plating. Wire & Iron Products, Inc.

412 **Casters and Wheels**—Catalog 138 is a 191-pp product manual on company's line of casters and wheels, describing design features and listing full specifications. Photos and drawings are used profusely to illustrate data, covering furniture casters, wheels, glides, desk shoes and various accessories. Darnell Corp.

414 **Railroad Car Spotter**—Book 2092 describes a car spotter with which one man can easily spot six loaded railroad cars at one time —or handle scores of other tasks involving horizontal haulage in either direction or around corners. This spotter consists of a vertical capstan, helical and worm gear drive, housing and integral motor. Engineering information, instructions for calculating rope pulls and typical layouts for both car spotters and car pullers are provided. Link-Belt Co.

SPACE, PROCESS HEATING

415 **Unit Heaters**—Bulletin 7517, 48 pp, presents full information on latest design of this company's Venturafin unit heaters for steam or hot water applications. Gives features of construction, general engineering data, capacity tables. Fully illustrated with photos of horizontal and vertical models, dimensional drawings and piping diagrams, booklet includes tips on the use and selection of unit heaters. American Blower Corp.

416 **Plumbing, Heating Supplies**—Edition H is the current edition of this company's 126-pp general catalog on plumbing and heating repair parts, tools and accessories. Indexed and generously illustrated; gives sizes, intended uses. J. A. Sexauer Mfg. Co., Inc.

418 **Engineering Data for Heating Systems** —A great deal of helpful information on heating systems is presented in Engineering Data Manual 2695, 28 pp. Detailed illustrated information pertaining to heating problems is given. Besides covering heating terminology, there are sections on steam data, water properties, piping data, weights and measures and pipe dimensions. C. A. Dunham Co.

419 **Electric Heating Units**—Catalog 50, 50-pp, contains complete engineering data on electrical heating units and equipment, including strip elements, finstrip elements, tubular elements, cartridge elements, ring elements, immersion heaters, circulation heaters, radiant heaters, forced air duct heaters, unit heaters, hot plates and others. Includes photos, dimensional drawings, price and standard rating tables and other specifications. Edwin L. Wiegand Co.

420 **Hot Water for Industry**—An excellent engineering data booklet, "Hot Water for Industrial Plants," is a compilation of literature covering use of water heaters for process needs, cafeterias, lavatories, wash fountains, laboratories. Discusses hot water requirements for these applications; describes and illustrates heaters, recovery systems, booster units applicable; provides installation suggestions and operating instructions. Available to qualified plant engineers. A. O. Smith Corp.

421 **Unit Heaters** — Catalog 155, 32 pp, presents unit heaters for steam and hot water in vertical and horizontal delivery and power-throw types. Covers design features and provides performance and capacity data. Also

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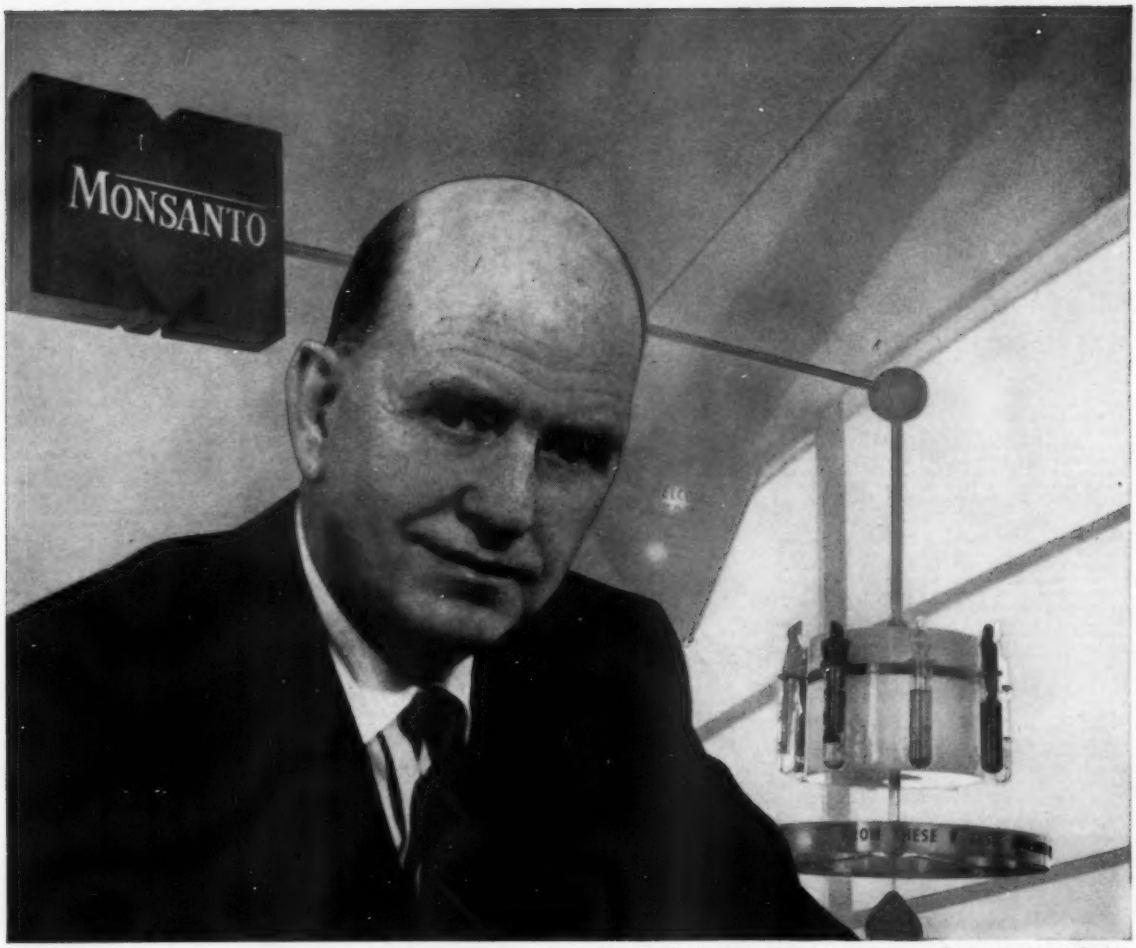

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(Begins on page 192)

provides information on unit heater selection, sound ratings, locating unit heaters, motor wiring and control. Piping and installation suggestions are included as well as typical unit heater specifications. Modine Mfg. Co.

422 **Industrial Ovens** — Thirteen types of company's Conventioneered ovens, which apply principles of forced convection heating to various industrial processes, are illustrated and described in 12-pp Bulletin 200. These ovens serve foundries, metal finishers, plastics producers. The W. W. Sly Mfg. Co.

423 **Hot Water Heating Systems**—Catalog GK-954, 24 pp, features a complete line of equipment for forced hot water heating systems and chilled water cooling systems. Nine pages are devoted to information on a complete line of circulating pumps for dozens of applications. All-bronze pumps for circulating service water and silent operating centrifugal pumps for boosting water pressure are a few of the new applications. Valves, fittings, air vents, air tanks and water heaters are also described in detail. Bell & Gossett Co.

424 **Industrial Ovens** — Engineering, manufacturing and installation of processing ovens are described in Bulletin D-53-20, 16 pp. Covers oven types, application to industry source of heat, selection of heater, control of heat, distribution of heat. Photos show typical oven installations, and a complete modern finishing process is presented. Newcomb-Detroit Co.

FANS, VENTILATING

425 **Industrial Fans**—Propellair Bulletin 650, 12 pp, contains dimensions, application, and performance data on Tubeaxial and Stack-booster fans. Gives information on cooling and drying problems, system and open surface tank ventilation. Robbins & Myers, Inc.

426 **Ventilating Sets** — Quiet operation, rugged construction, lower costs and other advantages of Util-A-Vent sets are stressed in 30-pp Bulletin UVS 103. These sets are designed for low cost handling of applications requiring low and medium ranges of air capacities. Bulletin presents dimensional and capacity data on direct-driven units with forward curved wheels, and belt-driven units with forward curve or backward blade wheels. Performance curves are included. General Blower Co.

427 **Ventilating Equipment**—A 36-pp guide to selection of propeller fan type ventilating equipment, Catalog 152 includes specifications and installation data on company's propeller fans in portable, tubeaxial, centrifugal, roof ventilator and other types. Detailed illustrations of construction features accent design and performance factors. Case study photos show installations. Ilg Electric Ventilating Co.

To order these catalogs circle item numbers on the handy Reader Service Cards provided on pages 187-188.

428 **Induced Draft Fans**—Eight-pp Bulletin DB-32-53 provides engineering information on manufacturer's Bifurcator fans for providing controlled draft for boilers and furnaces. Gives construction details, sizes. Illustrated with photos, diagrams of suggested methods for installation. DeBothezat Fans Div., American Machine and Metals, Inc.

429 **Standard Duty Fans**—Design and construction details of company's line of standard duty fans are covered in 28-pp Bulletin 543. Points out advantages, shows arrangement and application, describes accessories. Tables list specifications. The New York Blower Co.

430 **Roof Ventilators**—Bulletin A-112, 12-pp, contains engineering data on company's line of roof ventilators designed to eliminate backflow of air and increase air delivery for maximum efficiency. Includes photos illustrating construction details, dimensions, cutaway views and dimensional drawings, as well as tabulated rating data. Hartzell Propeller Fan Co.

DUST CONTROL AND AIR CONDITIONING

431 **Dust Control, Blast Cleaning**—Bulletin 1210, 24 pp, fully illustrated, describes manufacturer's line of blast cleaning and dust control equipment, accessories. It is indexed according to equipment, type and purpose. Lists three methods of application. Pangborn Corp.

432 **Dust Control** — "Engineered Efficiency in Dust Collection and Recovery," 36 pp, discusses industrial dust recovery from standpoint of nuisance abatement, waste avoidance, hazard elimination. Shows effect of variation in particle size, distribution and specific gravity of dust on efficiency of the dust collecting system Buell Engineering Co., Inc.

433 **Manual of Exhaust Hood Design**—Bulletin 270-E1, 24 pp, features engineering data on dust control systems for the metal working industries. Illustrates and discusses the design of exhaust hoods for many operations in this field. Also, 61 photos of dust control installations show various methods of hooding dust source. American Air Filter Co., Inc.

434 **Dust Collectors** — Operation, construction, versatility and maintenance of company's unit dust collectors are explained in this bulletin. Includes capacities, sizes. The Kirk & Blum Mfg. Co.

435 **Flexible Hose**—A set of five bulletins (Nos. 40 through 44) are of interest to plant engineers concerned with the design, installation or purchase of flexible hose for dust and fume control, air conditioning and materials handling. They provide general information, data on installation, application suggestions, technical data and prices on hose, duct and accessories. The Flexaust Co.

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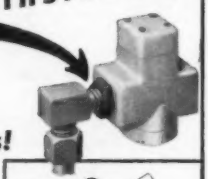
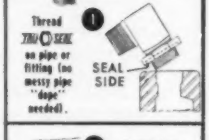
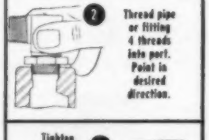


1 Thread TRU-O-SEAL on pipe or fitting (no messy pipe "dope" needed). SEAL SIDE



2 Thread pipe or fitting 4 threads into port. Point in desired direction.



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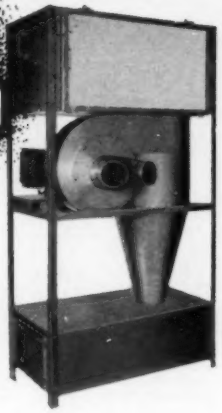

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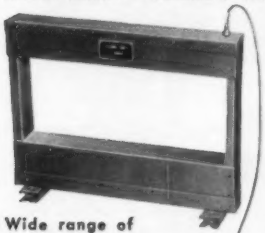

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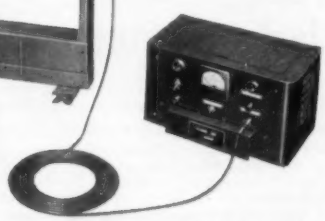

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1 **Vessels that wear out too soon?**

2 **Processes that contaminate your product, reduce yield or corrode equipment quickly?**

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5 **Fumes which attack and destroy ducts or stacks fast?**

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Pfaudler engineers and fabricates corrosion resistant equipment built of glassed steel (resistant to both acids and alkalies), stainless steel, Hastelloy, titanium, nickel, copper, aluminum, etc. Our applications engineers recommend combination of materials that give you the best return on your investment.

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THE PFAUDLER CO.

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SPECIALISTS IN CORROSIONEERING

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DATA FILE

(Begins on page 192)

436 **Dust Control Systems**—Valuable engineering data on methods of dust control as well as descriptions of company's line of dust collectors are contained in illustrated Bulletin 636-2. Specifications on all models are included. A special section tells how to design your own system. Aget Mfg. Co.

437 **How Conditioning Units Can Help**—The advantages of self-contained units in cooling, dehumidifying, cleaning are cited in 40-pp Catalog 1307. Explains installation, operation. Provides data on direct expansion and cold water cooling and on hot water and steam heating. Clarage Fan Co.

438 **Air Conditioning Filters**—Bulletin 600, 8 pp, describes company's Staynew ventilation and air conditioning filters. Specifications, engineering, performance and installation data covering dry type panel filters for the removal of air-borne impurities given. Dollinger Corp.

PUMPS, COMPRESSORS

439 **For Hazardous Liquids**—Catalog Section D, 12 pp, presents company's line of Underwriter rotary pumps for hazardous liquids. Both mechanical seal and deep stuffing box models are shown and dimensions and specifications provided. Various mounting arrangements and drives available for these UL approved pumps are also cataloged, and application suggestions are given. Also in this booklet are performance graphs. Viking Pump Co.

440 **Condensed Pump Data** — Form 4383-J covers more than 20 types of general service pumps, rotatry pumps, sump and drainage pumps, condensate units, self-priming units, stainless steel pumps and high-pressure pumps. In easy-to-find tabular form, each model is pictured along with its characteristics, applications and features. Goulds Pumps, Inc.

441 **High Vacuum Pumps** — Catalog 400 describes company's mechanical booster high vacuum pumps. Points out advantages of two-stage construction, and illustrates characteristics in metallurgical vacuum processing, metallized coating, foundry research and pharmaceutical applications. A cutaway view is included, together with performance curves which show typical pumping speed, other data, horsepower vs. inlet pressure. Kinney Mfg. Div., The New York Air Brake Co.

442 **Compressor Data** — Feather valve compressors from 75 to 350 hp are described in 32-pp Bulletin L-676-B1A. Advantages on installation, operation and maintenance costs are outlined for types YC and DYC compressors. Information and illustrations are offered on component parts, including frame, running gear parts, intercooler, crosshead, motor and main bearings and various cut-away views are included. Variable capacity control information is listed along with data on governors. Diagram illustrates correct selection and coordination of auxiliary equipment. Worthington Corp.

443 **Compressors** — Bulletin A72, 36 pp, gives construction, operation information on company's Class WN-114 heavy-duty air compressors. Illustrates seven models of compressor as a single unit for displacement capacities from 1186 to 1948 cfm, twin units furnishing up to 3896 cfm. Joy Mfg. Co.

444 **Portable Compressors**—Twelve-pp Catalog GG-9A pictures 40 models of company's portable type compressors. A quick reference chart shows capacities, engine types, and mountings available. Illustrates such features as: replaceable cylinder sleeves, interchangeable valve parts, aircraft type compressor cylinders, heavy duty industrial type engines, and magneto ignition on all gasoline models. Le Roi Div., Westinghouse Air Brake Co.

445 **For On-the-Spot Air** — Eight-pp Form 2302 features company's self-contained Spot-Air portable compressor. Deals with the many tools it will operate, with actual on-the-job illustrations pointing out added advantages of this light-weight compressor on jobs where bigger compressors are not needed. Ingersoll-Rand Co.

446 **Gas-Engine Driven Compressors** — A two-cycle turbocharged compressor is described in 24-pp Bulletin 134. Stresses economy of installation and operation afforded by this gas-engine driven unit, lists other advantages. Explains how turbocharging saves on fuel and cooling. Design and construction features are discussed. Clark Bros. Co.

SYNTHETICS

447 **Nylon For Maintenance**—Nylon as a maintenance material for mechanical, chemical and electrical applications is described in this illustrated folder. Advantages are given, and specific uses listed along with a lineup of material's maintenance properties. Stock shapes and sizes are shown and finished parts illustrated. Tips on machining are offered. The Polymer Corp. of Pennsylvania.

448 **Synthetic Fluids, Lubricants** — Form F-6500D, 52-pp, on synthetics, covers properties, applications, and characteristics of these polyalkylene-glycol derivatives. Describes uses as mechanical lubricants, hydraulic fluids, rubber and textile lubricants, heat-transfer fluids, antifoam agents, solvents, and formulation components. Engineering data is presented in the form of tables and charts, and application photos included. Carbide and Carbon Chemicals Co., Div., Union Carbide and Carbon Corp.

BOILERS, GENERATORS

450 **Packaged Boilers**—This 16-pp illustrated catalog describes manufacturer's new Type VP Package boiler. Following a section of background information is an outline of principal design features of these boilers, which are shop assembled and provide steam capacities from 4000 to 40,000 lb per hour. Space requirements are shown in a table along with specifications. Combustion Engineering, Inc.

451 **Steel Boilers**—Revised General Catalog 80, 32-pp, is a condensed but complete product guide on company's high and low pressure steel boilers. Also included are full descriptions and

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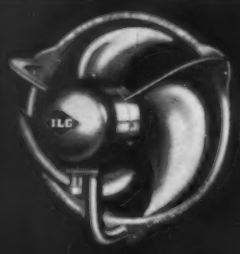

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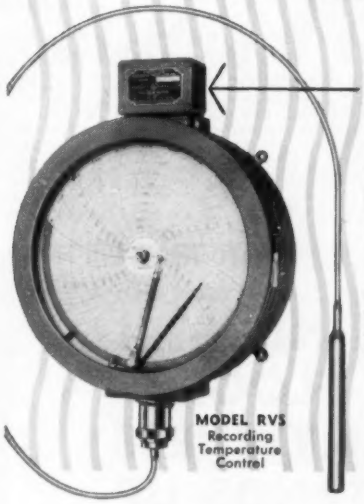

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DATA FILE

(Begins on page 192)

illustrations of water heating products, both direct fired and storage types as well as indirect water heating coils. Pages on boiler support brackets, structural steel suspension and induced draft fans, as well as pictures of installations of these boilers are also included. Kewanee-Ross Corp.

452 **Standard Generators** — Bulletin B-55-4 describes company's SC economy series of standard steam generators designed to reduce steam costs for industrial plants. Pre-engineered, standardized steam generators offered in nine sizes, with capacities of from 50,000 to 150,000 lb per hour are described, and schematic and cutaway drawings of the units and design features are included. Foster Wheeler Corp.

454 **Package Boilers**—This 12-pp booklet on package steam generators describes the formulas behind all package steam generators, and illustrates how installation of a package steam generator can raise steam capacity in an existing boiler room without extensive structural changes. Shows plant operators how to make survey of their own steam requirements. Cyclotherm Div., National-U. S. Radiator Corp.

455 **Self-Contained Boilers** — Bulletin AD-144 reviews company's new CB boilers. Illustrations include installations, demonstrations. Engineering articles are featured covering such subjects as low noise level. Cleaver-Brooks Co.

VIBRATION CONTROL

456 **How to Cut Vibration**—The use of Vibra-Mount felt in reducing machine vibration and accompanying noise is covered in this 20-pp illustrated booklet. Tells where this shock-absorbing felt is used effectively, how to select the proper mount, and how to install it. Cost information is provided, other felt products are listed. American Felt Co.

457 **Improved Machine Mounts**—This brochure describes advantages of company's leveling machine mounts. Tells how they enable installation and leveling of heavy machines without bolting or shims, afford increased machine mobility, reduce maintenance costs, and lessen noise. Barry Controls, Inc.

458 **Vibro-Isolators** — Bulletin K3A gives latest data on stopping vibration, shock and noise transmission by using company's steel spring machinery mountings. Typical case-histories, complete with installation photos, tell how vibro-isolators solved a variety of vibration problems. Tables giving capacities and characteristics are furnished, including isolator sizes, load capacities, dimensions, and shipping weights. Drawings illustrate typical installation arrangements. The Korfund Co., Inc.

OTHER EQUIPMENT

459 **Finishing Systems**—Illustrated Catalog A-653, 12 pp, describes complete finishing systems for porcelain and synthetic enamel, lacquer, paint, and other finishing. Also covers a variety of other industrial equipment including ovens, dust collectors. The R. C. Mahon Co.

460 **Humidification for Profit**—Bulletin 500, 16 pp, includes physical data and prices on electrically controlled and air operated humidifiers. Handbook section explains how relative humidity affects hygroscopic materials, static electricity, health and comfort. Photos show installations and several pages are devoted to selection and installation tips. Many helpful tables included. Armstrong Machine Works.

461 **Preheating Combustion Air**—This well-illustrated 36-pp booklet explains fuel savings and increased performance made possible by using waste heat in flue gases to preheat incoming combustion air. Also covers increased boiler output, ability to use lower grade fuels. Air Preheater Corp.

462 **Washroom Advisory Service** — Form 1367, 34 pp, is an illustrated brochure describing company's washroom advisory service aimed to help in planning of well-designed, easily maintained and properly equipped personal service rooms. Describes basic washroom facilities, combination locker, shower and washrooms, and combination lounge, powder and washrooms. It also features washroom fixtures and towel and tissue supplies. Scott Paper Co.

463 **Industrial Leathers** — These illustrated data sheets cover company's leather products and include belting. Also give data on leather packings for hydraulic and pneumatic equipment. J. E. Rhoads & Sons.

464 **Inert Gas Generators** — Bulletin IGG-155, 10-pp, describes inert gas generators for protection against fire and explosion. In addition to detailed drawings, photos, capacity and dimension tables, book contains a useful information sheet. Includes an analysis of the work to be done by generators, operating conditions, utilities needed and other data needed for selection. Roots-Connersville Blower Div., Dresser Industries, Inc.

465 **Sling Chain Handbook**—Illustrated Data Book 100, 32-pp, presents "how to do it" information on sling chains—from ordering to care, use and inspection. Contains diagrams, charts and tables on standard and special styles of sling chains and attachments, and their sizes, weights, and working load limits under many conditions. Columbus McKinnon Chain Corp.

466 **Teflon Products** — Three bulletins present this company's Teflon packings, gaskets, special parts and stock. Bulletin CP552 describes Chempro lines of Teflon ring packing, Teflon impregnated asbestos packing, V-type packing, and Teflon seal cage—for use with acids and strong chemicals. Bulletin CP553 covers Teflon jacket gaskets, solid ring gaskets, expansion joints and special gaskets. Bulletin CP554 illustrates special parts. Chemical & Power Products, Inc.

467 **Glassed Steel Reactors**—Bulletin 927, 8-pp, describes glassed steel reactors for processing a wide variety of products under diverse conditions, stressing their versatility as to corrosion resistance, agitation, and temperature-pressure range. Standard specifications are tabulated and dimensional diagrams are included. The Phaudler Co.

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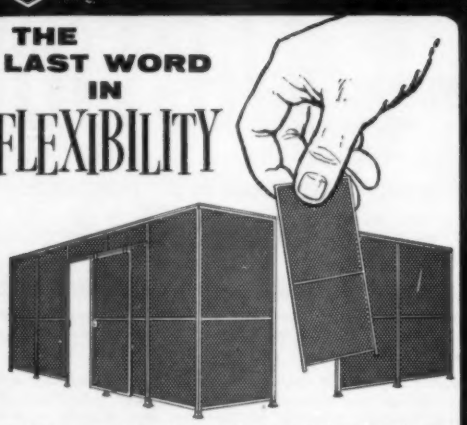

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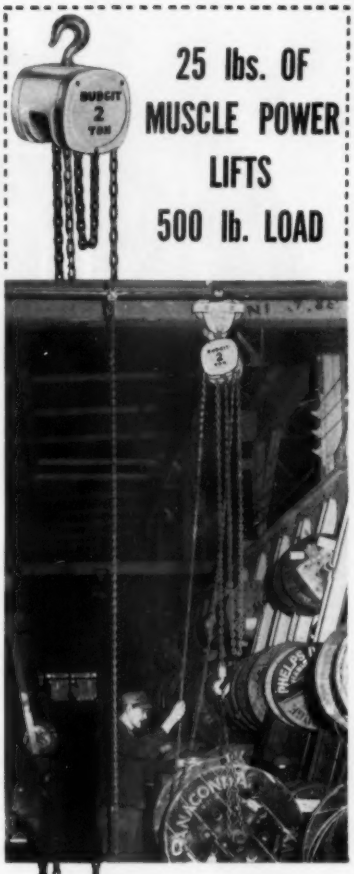

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Builders of "SHAW-BOX" and 'LOAD LIFTER' Cranes, 'BUDGIT' and 'LOAD LIFTER' Hoists and other lifting specialties. Makers of 'ASHCROFT' Gauges, 'HANCOCK' Valves, 'CONSOLIDATED' Safety and Relief Valves, 'AMERICAN' and 'AMERICAN-MICROSEN' Industrial Instruments, and Aircraft Products.

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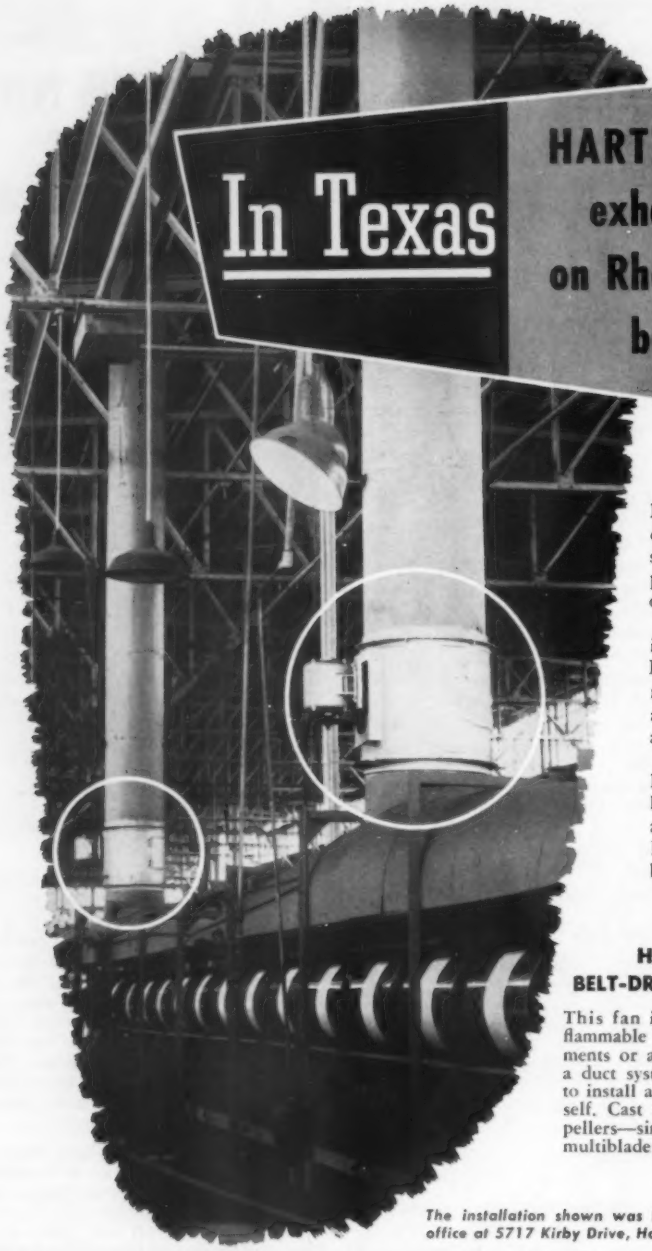


In Texas

HARTZELL DUCT FANS exhaust smoke and fumes on Rheem's high-speed barrel production line

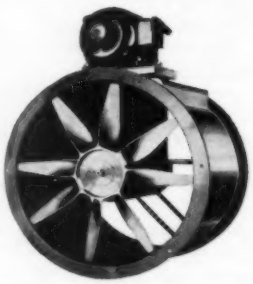
At the Rheem Manufacturing Company plant in Houston, Texas, two 24″, 1 HP Hartzell belt-drive duct fans in a perforated head remove welding smoke and paint fumes along a high speed barrel production line. Other Hartzell fans power similar exhaust systems in every state in the Union.

Why should Rheem choose Hartzell? Because in thousands of tough industrial installations, Hartzell fans have proved their efficiency, rugged reliability and long life. And these are the characteristics wide-awake management demands of its air moving equipment.

If you have an air-moving problem of any kind, Hartzell fans . . . and Hartzell engineering "know-how" . . . can solve it for you. But don't wait until a problem arises . . . get acquainted now with what Hartzell can do for you. Just mail the coupon below or call your nearby Hartzell field engineer.

HARTZELL BELT-DRIVE DUCT FAN

This fan is ideal for moving flammable fumes, corrosive elements or abrasive dust through a duct system. And it's as easy to install as a section of duct itself. Cast aluminum alloy propellers—single, two-propeller or multiblade models—12″ to 60″.



The installation shown was handled by the Hartzell field office at 5717 Kirby Drive, Houston, Texas, phone KE-4565.

HARTZELL propeller fan co.

Div. of Castle Hills Corp.

201 Herrman Ave. Piqua, Ohio

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Save **unnecessary wear on costly pumps and other equipment by preventing intake of abrasive particles.**

Save **spoilage and rejects at point of use by insuring clean, clear liquid.**

Save **man-hours wasted while new machines are being installed and old ones repaired.**

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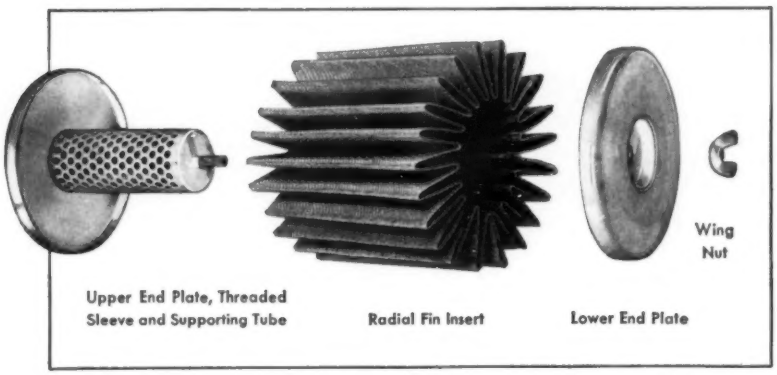
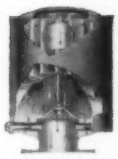
MODEL HE HYDRAULIC FILTER

For top performance and economical operation specify Staynew Filters as original equipment on your hydraulically operated machinery.



Entire unit may be disassembled in 30 seconds merely by unscrewing wing nut at bottom and drawing out Radial Fin Insert.

Insert may be cleaned with solvent or brush in a matter of seconds



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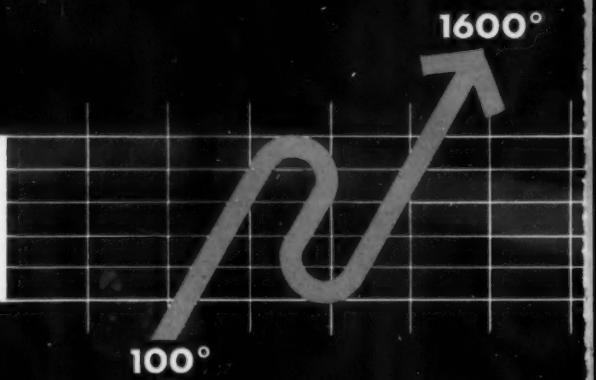

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AUGUST, 1956

Plant Engineering

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